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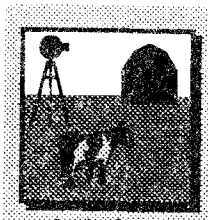

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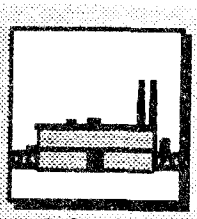

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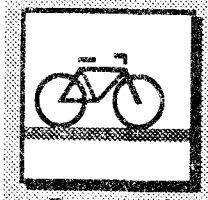
Rocky Flats Plant
FY93 Systems Engineering Analysis
Facility/Land Use Component

August 13, 1993



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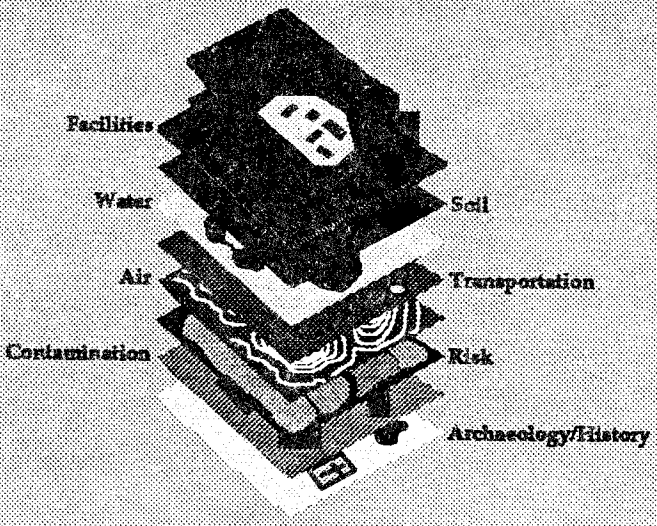

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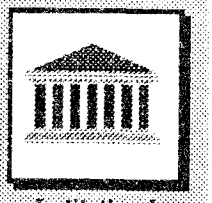

Institutional

Rocky Flats Plant
FY93 Systems Engineering Analysis
Facility/Land Use Component

Final Draft

August 13, 1993

Title: **RFP Systems Engineering Analysis**
Facility/Land Use Component

INFORMATION ONLY

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Approved by:
Environmental Protection Management Department:
Environmental and NEPA Division Manager:

S. M. Nesta 5/21/93
(Name and Signature) *(Date)*

DISCLAIMER

United States
Department of Energy
Rocky Flats Plant

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PREFACE

Facility/land use planning will be a crucial activity in the dispositioning of the Rocky Flats Plant site as the mission of the plant changes from nuclear weapons component production. As a result of the current uncertainty regarding the ultimate endstate for the site, this document identifies some of the major issues to be considered in facility/land use planning for the Rocky Flats Plant, but does not attempt to resolve them. These issues will be articulated and resolved, as appropriate, in future iterations of the Integrated Planning Process, which is the pilot study at the Rocky Flats Plant to develop an advanced, comprehensive, and integrated planning methodology that is currently not available within the DOE complex.

The Integrated Planning Process will combine the traditional Roadmap planning process with elements of the mission planning process developed at the Hanford site. Through the merger of these planning methodologies, an improved planning process and products will be generated. The principal product of the Integrated Planning Process will be the Rocky Flats Plant Integrated Roadmap. Generation of the Integrated Roadmap will rely heavily on results of the Systems Engineering Analysis, of which the Facility/Land Use Component is an integral part (see Figure 1-1, page 1–4).

For the purposes of this document, the term "land use" is synonymous with "facility/land use." Although the shorter phrase is used throughout the document in the interest of readability, it is important to note that consideration of facilities will be an integral component of any land use planning for the Rocky Flats Plant site. To assist the reader with terminology, glossary entries are indicated by boldface type the first time they appear in the text.

Section 1:
OVERVIEW

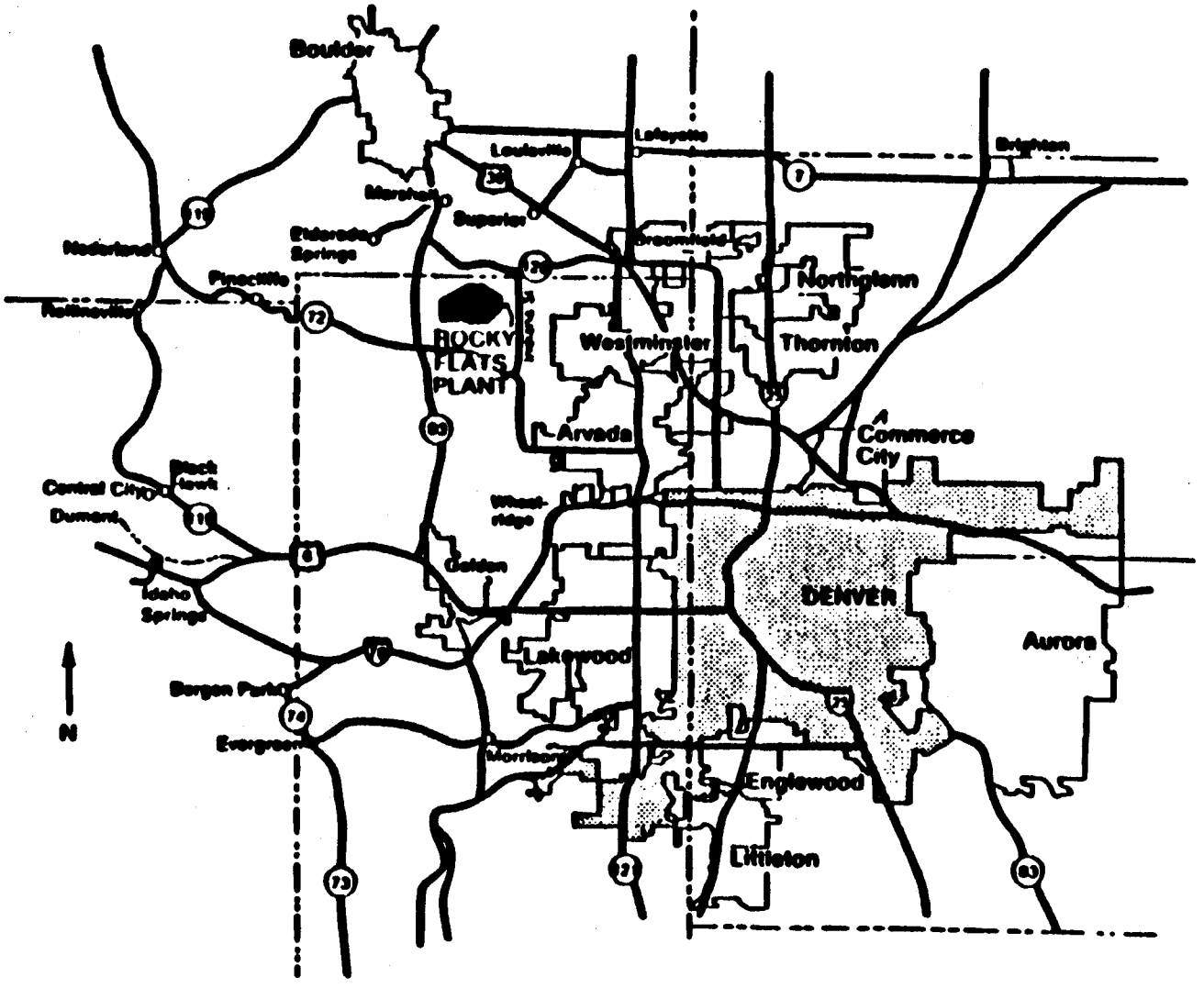
Due to this change in mission, DOE has requested that an analysis be conducted to ascertain alternatives for an ultimate facility/land use (endstate) at RFP. The FY93 Systems Engineering Analysis (SEA) Facility/Land Use Component has been created in response to this request. The analysis of alternatives for RFP will be conducted using the SEA and will allow a general comparison of possible strategies to achieve the final endstate for RFP.

INTRODUCTION

The Rocky Flats Plant (RFP) is a national defense facility owned by the U.S. Department of Energy (DOE) and operated by EG&G Rocky Flats, Inc., a subsidiary of EG&G, Inc. RFP is located approximately 16 miles northwest of Denver, Colorado, (see Map 1–1) and occupies 384 acres amid the **Buffer Zone**, a 6,550-acre natural preserve. The area around RFP holds a relatively dense population, with approximately 2 million people living within a 50-mile radius.

Since the early 1950s, RFP has operated as one of seven production plants in the DOE Weapons Complex. Changing global political conditions have, however, prompted the Secretary of Energy to announce that the weapons complex would be reshaped to provide a more cost-effective program. In 1992, it was determined by DOE that the new mission for RFP would be environmental cleanup and potential economic development. As stated in the *Rocky Flats Transition Plan, Report to Congress* in July 1992, a production contingency status would be retained pending the Nuclear Weapons Complex Reconfiguration Programmatic **Environmental Impact Statement** (PEIS) Record of Decision (ROD) scheduled for January 1995. In April 1993, Dr. Everet Beckner, Acting Assistant Secretary for Defense Programs, informed Congress of the President's decision to cancel the production contingency status for RFP.

Due to this change in mission, DOE has requested that an analysis be conducted to evaluate alternatives for an ultimate facility/land use



Area Map of Rocky Flats and Surrounding Communities

Map 1-1

(**endstate**) at RFP. The Fiscal Year 1993 (FY93) Systems Engineering Analysis (SEA) Facility/Land Use Component has been created in response to this request. The analysis of alternatives for RFP will be conducted using the SEA and will allow a general comparison of possible strategies to achieve the final endstate for RFP.

This SEA Facility/Land Use Component will employ a multidisciplinary approach and will draw on all available facility/land use plans. This component will be based on accepted and recognized industry-wide and local government comprehensive planning principles.

PURPOSE

The purpose of the FY93 Facility/Land Use Component is to provide information to assist in DOE facility/land use decisions related to RFP. Through the use of this information, compatibility can be achieved for development of projects based on (1) ecological and natural utility, (2) technical factors and regulations related to potential cleanup requirements and, (3) socioeconomic and contiguous land use factors.

The Facility/Land Use Component is simply a tool that will facilitate a comparative evaluation of **bounding** and intermediate facility/land use endstates for RFP. ***This is not a land use plan.***

This executive summary for the Facility/Land Use Component is designed to provide a bridge between traditional land use planning and the planning process at RFP. The intent is to use language and terminology that can be easily understood and translated by DOE and other **stakeholders**. Because the Facility/Land Use Component is designed to support analysis of endstates and not to show how to reach an endstate, this document does not attempt to address issues related to pre-endstate activities. Pre-endstate activities are addressed in the *RFP Mission Transition Program Management Plan*, EG&G Rocky Flats.

The Facility/Land Use Component is a dynamic planning tool that will continue to evolve over the life of the Integrated Planning Process.

RELATIONSHIP TO OTHER RFP PLANNING TOOLS

The Facility/Land Use Component will have a relationship to existing planning tools at RFP, which include National Environmental Policy Act (NEPA) documentation, the SEA, the Integrated Planning

Process (IPP), the **Transition Plan**, the Site Development Plan, and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Although the relationship of the Facility/Land Use Component to these existing planning tools has not yet been firmly defined, a general description of the relationship is provided below.

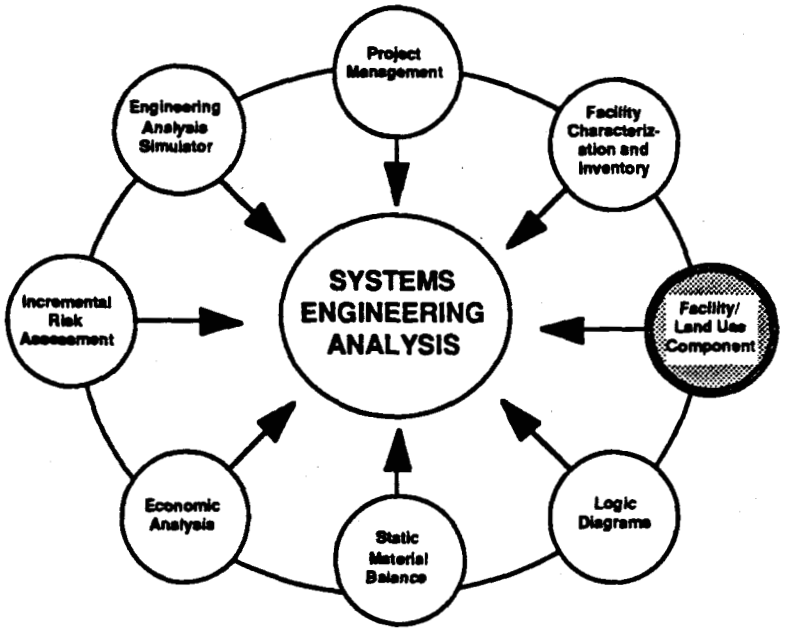
Relationship to NEPA Documentation

The Facility/Land Use Component will be available as baseline information for NEPA documentation. The NEPA process will provide the legal and regulatory mechanism for public input and comment. NEPA alternatives identified in the Site-Wide Environmental Impact Statement (SWEIS) can be analyzed using the SEA process.

Relationship to Systems Engineering Analysis

The Facility/Land Use Component is one of eight components in the SEA (see Figure 1–1). This component will not only be a source of information for the Engineering Analysis Simulator Component of the SEA, but can also provide additional information for other types of analysis. It will provide in-depth information for risk and cost analysis and other areas yet to be determined.

Figure 1 –1 Systems Engineering Analysis Components



Relationship to Integrated Planning Process

For FY93, development of the Facility/Land Use Component of the SEA will include the identification of two bounding endstates and a test intermediate endstate for RFP with input and support from stakeholders. The two bounding and the one intermediate test endstate are principal inputs from the Facility/Land Use Component to the Integrated Planning Process for FY93.

Relationship to Transition Plan

This component will utilize information contained in the *Rocky Flats Transition Plan, Report to Congress.* As action plans are formulated and tasks outlined in the Transition Plan are implemented through the Integrated Planning Process, the Facility/Land Use Component will remain flexible and incorporate decisions until an endstate is determined and set as the ultimate goal.

Relationship to Site Development Plan

The information in the *1992 Site Development Plan,* which addresses facilities and **infrastructure** planning at RFP, will be incorporated into the Facility/Land Use Component. As noted in the Transition Plan, when the endstate is determined, planning to that ultimate goal will be adapted in future Site Development Plans.

Relationship to CERCLA

The Facility/Land Use Component will consider CERCLA regulations in all endstates, as CERCLA also requires examination of endstates before the cleanup level can be determined. The *Decision Analysis Framework for Selecting Future Land Use Scenarios to be Evaluated in Environmental Restoration Programs, Preliminary Draft, April 21, 1993,* currently being introduced within the DOE complex, has been researched and will be monitored to note formal acceptance and revisions that may occur during the development of the Facility/Land Use Component.

STAKEHOLDER PARTICIPATION

The SEA Facility/Land Use Component will be the result of a cooperative planning effort by DOE, EG&G, contractors, surrounding

counties and municipalities, regulators, citizens, and other stakeholders. The public effort, which is an intrinsic component of the Integrated Planning Process, will be coordinated by the DOE Office of Communications and EG&G Community Relations Department. A Stakeholder Involvement Plan will be included in the Integrated Planning Process to facilitate the ongoing and continuous incorporation of stakeholder and public comments and concerns.

DOE is committed to providing surrounding communities and stakeholders with opportunities for input into the decision-making process that will be used to determine the ultimate disposition of RFP facilities and land. In this regard, four major stakeholders have been identified: DOE Headquarters, the general public, internal RFP personnel, and regulators. Each of these groups will be divided into subcategories as needed and specific details for interaction will be provided.

A plan for stakeholder input into land use planning has been outlined by the Rocky Flats Local Impacts Initiative, a community-based organization planning for the future of RFP. A Public Involvement Plan, which outlines public participation in the Integrated Planning Process, has been drafted by EG&G Community Relations in conjunction with the Rocky Flats Local Impacts Initiative and is in the process of being implemented.

GENERAL FACILITY/LAND USE ISSUES RELATED TO RFP

The Facility/Land Use Component is, and will continue to be, based on a thorough review of pertinent reports, lessons learned from other facilities, and guidance documents. This component will provide the foundation for any formal land use plan developed for RFP. Although the change in mission has determined a general direction for RFP, there are many issues left unresolved. Key issues that must be addressed include the following:

Who will be the ultimate authority in endstate decisions?

What guidance will be followed in resolving mineral rights issues?

Which regulatory group takes precedence in determining NEPA/CERCLA/Resource Conservation and Recovery Act (RCRA) issues regarding risk factors and other endstate decisions?

Will facilities and/or land be declared "surplus" and turned over to the General Services Administration (GSA)? Can agreement be reached on the piecemeal transfer of land under the Community Environmental Response Facilitation Act (CERFA)?

Who will determine the time frame for achieving the endstate?

These general issues and others will be identified in the individual land use planning factor discussions contained in this document.

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Section 2:
LAND USE METHODOLOGY

Land use planning for RFP will consider land uses contiguous to the site, economic feasibility of potential land uses, and constraints and opportunities. These constraints and opportunities are identified by analyzing several general planning factors, which apply to any land use development, and other specific factors related to historical operations at RFP.

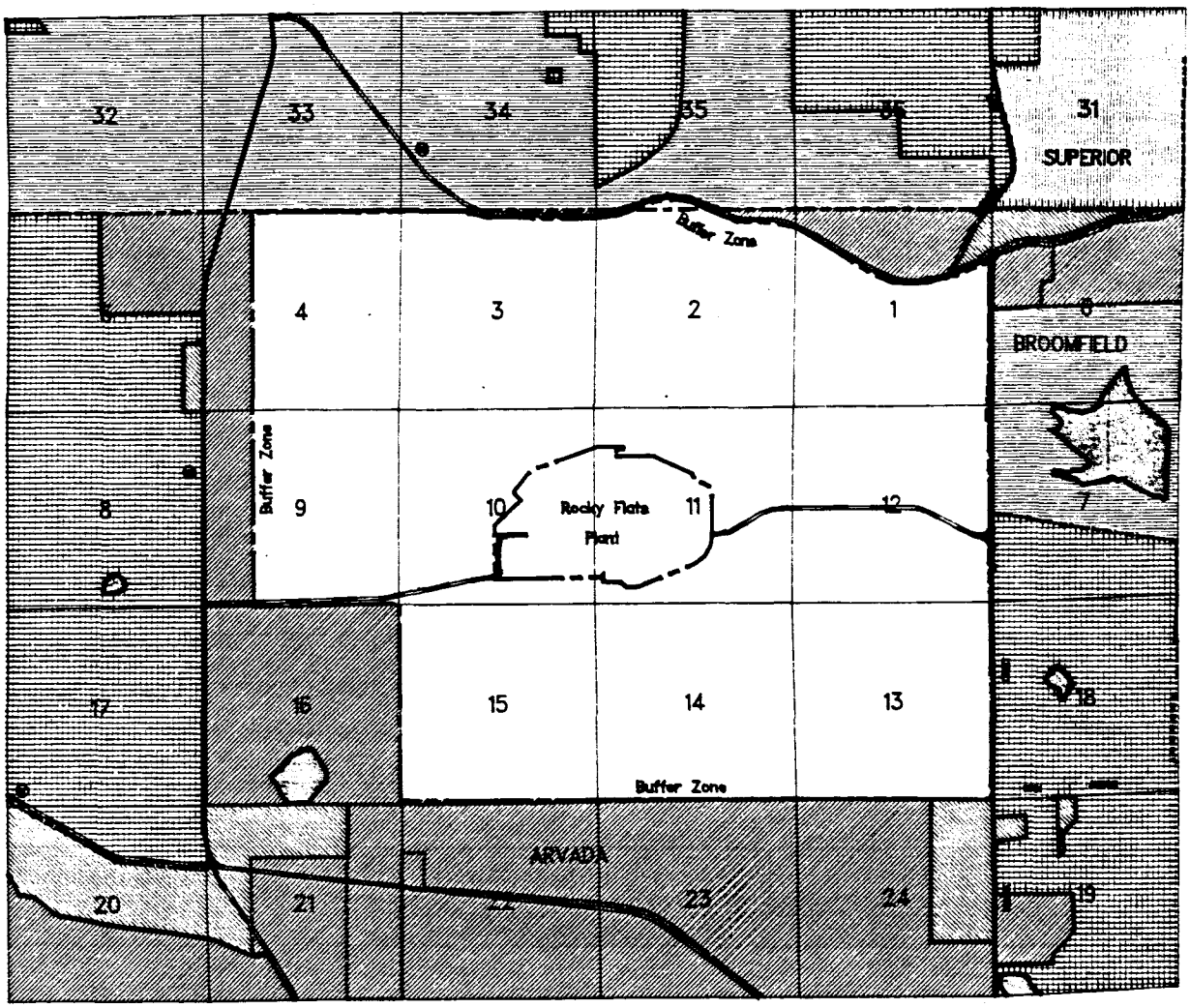
INTRODUCTION

Land use planning for RFP will consider land uses contiguous to the site, economic feasibility of potential land uses, and constraints and opportunities. These constraints and opportunities are identified by analyzing several general planning factors, which apply to any land use development, and other specific factors related to historical operations at RFP. As part of the Integrated Planning Process, endstate scenarios will be evaluated and a land use plan will be developed. The endstate land uses at RFP will depend on the level of **remediation** selected for affected areas.

CONTIGUOUS LAND USE

Contiguous land use is important in developing a land use plan, as future land uses within a given area are somewhat influenced by the land uses that already exist in the area. To identify the land uses that exist in close proximity to RFP, the land use contiguous to the plant has been mapped to a distance of at least one mile from the plant boundary using Public Land Survey section lines for reference (see Map 2–1).

As shown in Map 2–1, the area surrounding RFP is primarily open space, industrial, rural residential, and agricultural, including grazing and hay production. Some of the designated areas on the map do not reflect the mixed uses, such as the inclusion of rural subdivisions and farm residences. Current uses include crop land (wheat and hay) in the southeast corner adjacent to the plant boundary, an existing industrial area (Rock Creek Industrial Park) to the north of the plant boundary, and small acreage mini-farms to the east. To the west and southwest



SCALE

0 Feet 5000 10000

Rocky Flats Plant Contiguous Land Use Inventory

Data as of April 15, 1993

Data sources for this figure are included in the list of sources for the Contiguous Land Use subsection.

Note: There is scattered residential land use throughout the area contiguous to Rocky Flats Plant.

Map 2-1

EXPLANATION

- PRIMARY ROADS
- SECONDARY ROADS
- FENCE
- CITY LIMITS
- COUNTY BOUNDARY
- AGRICULTURAL
- OPEN SPACE/ AGRICULTURAL
- RESIDENTIAL
- AGRICULTURAL/ COMMERCIAL
- AGRICULTURAL/ INDUSTRIAL
- WATER

N

are mineral developments (primarily clay, sand, and gravel), irrigation and municipal water supplies, rural and suburban residences, and mountain and county park land or open space. A 14,000-acre mixed-use commercial, industrial, and residential development has been approved to the southwest, south, and southeast of the plant; however, this site has not yet been developed.

Development east of RFP has increased over the past decade. The cities of Westminster, Arvada, and Broomfield have expanded their boundaries to supply land for the growing demand of residential units and employment centers in the western half of the Denver metropolitan area. There is currently an increasing population base within a 5-mile radius of RFP (estimated at around 10,000 in 1989), primarily due to municipal expansion. In addition, other communities and county subdivisions are expanding in or toward the foothills, encroaching closer upon RFP.

Jefferson and Boulder Counties, and surrounding communities adjacent to RFP, have comprehensive land use plans for their jurisdictions. Future zoning and land uses around the existing RFP may change based on these plans. *The North Plains Community Plan,* which was developed under the direction of the Jefferson County Board of County Commissioners in cooperation with the cities of Arvada, Broomfield, Golden, Superior, and Westminster, identifies land surrounding the plant as primarily intended for nonresidential use: commercial, office, or industrial. Land in Boulder County adjacent to the plant is primarily identified as open space.

Issues

When discussing contiguous land uses, certain jurisdictional questions arise. Future land use at RFP will most likely be affected by the influence of the surrounding government jurisdictions. The following issues are some of the most important questions to come to terms with early in the planning process.

Who participates in the decision-making process regarding acceptable land uses at RFP?

Who writes the policies that govern land use planning and development for the site?

These questions are political and will definitely set the stage for the type of facility/land uses that will occur at RFP and in the surrounding area. Other questions that need to be answered include:

Who will own, administer, and manage the land and developments at RFP?

What are the financial considerations related to development, disposition, and change in land use?

Sources

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POTENTIAL LAND USES

There are several approaches to evaluating potential land uses. A traditional approach is based on needs and desires of the surrounding community, whereas an environmental approach considers environmental compatibility and inclusion of non-development uses. A carrying capacity approach includes environmental considerations and the investigation of infrastructure capacities and intensities of developed uses. A regional planning approach looks at population, economic base, and commodity markets. Because of the complexity of land use planning for RFP, all perspectives must be addressed and/or blended to achieve an appropriate endstate.

Potential endstates identified for RFP will most likely include the same land uses that are found throughout the surrounding region. These land uses include:

- Agricultural (livestock and crops)
- Industrial (manufacturing, warehouse, research and development, office/warehouse, mineral development, etc.)
- Commercial (retail and office)
- Residential (single and multi-family, mobile home)
- Recreational (parks, open space, golf courses, hunting areas)
- Ecological Preserve
- Institutional (schools, hospitals, prisons)
- Governmental (government buildings, libraries, jails, etc.)

- Public Facilities (water/wastewater plants, water supply, electrical utilities, landfills, etc.)
- Transportation
- Mixed Use (any combination of the above)

All of the potential land uses for RFP mentioned above are directly affected by the land use planning factors described in Sections 3 and 4. Some factors will affect land use decisions more than others and can be easily determined, while other factors can be determined only through negotiation and careful evaluation.

ECONOMIC FEASIBILITY

Economic feasibility plays an important role in determining future land use. Economic factors related to land development are such that major investments would not occur without some certainty as to the future economic viability of the area. Costs related to land and development, including infrastructure such as water and sewer systems, streets, and gas and electric services, contribute to land use decisions. The economic climate, interest rates, growth rates, environmental concerns, and jurisdictional land development policies all influence the economic feasibility of developing land.

As endstate scenarios are determined, economic factors will become more important and will need to be explored in-depth.

CONSTRAINTS AND OPPORTUNITIES

Many of the constraints that determine the feasibility and appropriateness of the development of a particular site are physical and spatial in nature (e.g., **wetlands**, steep slopes, contamination). The level of constraint will vary depending on the land use. These constraints can be mapped and evaluated. For example, a wetland can be easily mapped and displayed as a constraint on industry or as an opportunity for a wildlife preserve. Thus the term "constraint" implies the complementary conditions "lack of constraint" and "opportunity".

Geographic information system (GIS) computer-based analysis will be used to graphically display constraints and to identify feasible land uses for RFP.

Data Maps

Land use planning factors that may constrain future land use and that also possess a spatial character will be identified. These spatial factors include the following:

Physical

- Steep, moderate, and shallow slopes
- Soil types
- Geology
- Surface water, streams and wetlands, and groundwater
- Flood potential
- Mineral/petroleum potential
- Climatic features

Ecological

- Vegetation species and habitats—present and potential
- Wildlife species and habitats—present and potential

Socio-physical

- History/archaeology
- Existing buildings and infrastructure onsite
- Existing and potential buildings and infrastructure contiguous to the site
- Visual significance and vulnerability

These data will be collected and stored as individual "layers" in the GIS for the RFP so that they can be combined and displayed as needed to produce constraint maps.

Constraint Evaluation by Land Use

The data maps must be evaluated to see how they constrain each potential land use. In the sample land use constraint matrix (Figure 2–1), each column is a land use and each row is a factor on a data map. Where column and row intersect there is a pattern or symbol indicating the level of constraint—from severe constraint to opportunity. Many of the needs and constraints for each kind of land use at any site are well known. Given the unique nature of the site, however, some must be researched in-depth to be identified. Specialized analyses may be needed but unavailable during the early

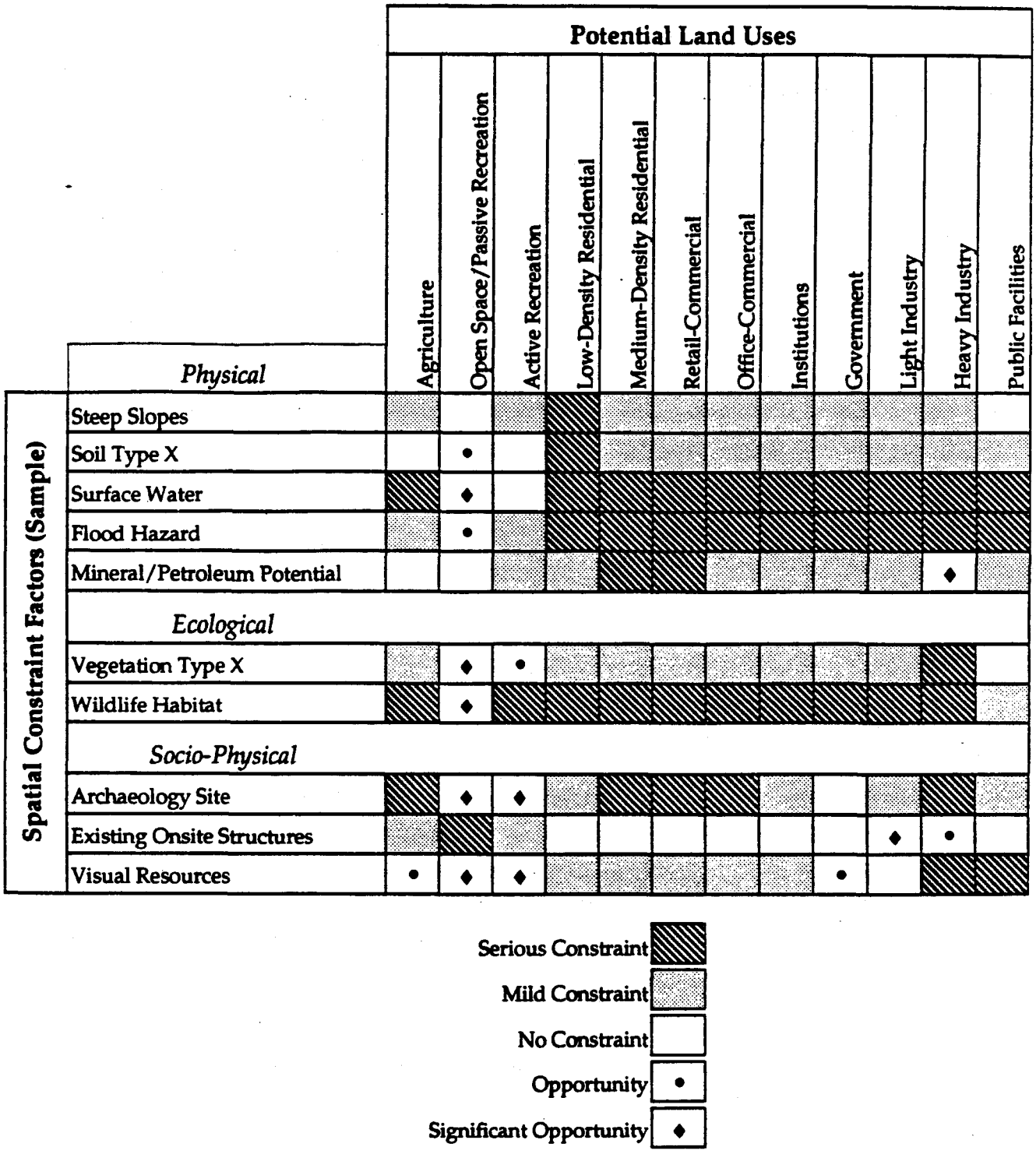

Figure 2-1 Sample Land Use Constraint Matrix

stages of planning. Technology development (or the failure to develop) may change evaluations. The constraints evaluation will proceed through a series of steps from preliminary to final to accommodate the phased arrival of information.

Graphic Display of Constraints

The data maps will be overlaid to form a composite map that expresses the constraints on each type of land use. This composite map will allow overlapping constraints to be displayed and identified. As the constraints are evaluated for all potential land uses, patterns will form. Constraint maps for two or more land uses may be virtually identical, resulting in the combination of certain constraint categories and a reduction in the number of maps. The result will be a set of land use constraint maps. They can be interpreted in the negative—where there are serious constraints the land use should be avoided. Or, they can be interpreted in the positive—where there are few or no constraints the land use can be encouraged if it is economically or otherwise feasible.

SCENARIO DEVELOPMENT

Land uses will be organized on the site to minimize conflicts with the land use constraints and to take better advantage of the opportunities. At this point, a broader set of considerations is incorporated to shape the land use scenarios. *Where can roads and other infrastructure be best located? Which stakeholder hopes and concerns are emphasized? What land use policies apply to the area?*

In determining appropriate land uses for a particular area, the question of land use compatibility arises. For example, it is unlikely to find a high-end residential development immediately adjacent to a landfill. Typically, mixed-use land development can occur with proper planning of landscaping buffers, natural land barriers, and types of development treatment to merge the mixed uses.

Contiguous land uses also play a role in determining what is acceptable for an endstate scenario at RFP. Currently, the surrounding area is primarily used for open space, industry, rural residences, and agriculture. As decisions on issues related to alternative land uses at RFP are made, other land uses around the plant may occur. Future uses outside the plant boundary and selected endstates at RFP will, without a doubt, influence each other.

Section 3:
GENERAL FACILITY/LAND USE PLANNING FACTORS

The general land use planning factors . . . are appropriate to any land use plan . . . . Analyzed independently and jointly, these factors will help to determine appropriate endstate uses for the plant and buffer area.

INTRODUCTION

This section identifies land use planning factors that will ultimately help to determine the final land uses at RFP. Each of the planning factors listed in Table 3–1 has unique importance associated with these final land uses. The general land use planning factors are appropriate to any land use plan; RFP-related land use planning factors specifically address land use issues at the plant. Analyzed independently and jointly, these factors will help to determine appropriate endstate uses for the plant and buffer area.

Table 3–1 Facility/Land Use Planning Factors

GENERAL	ROCKY FLATS RELATED
Ecological and Natural Features	Facilities
Air	Waste
Water	Contamination
Infrastructure	Risk Assessment
Transportation	Technology Development
Visual Analysis	Safeguards and Security
Archaeology and History	
Socioeconomic Analysis	
Regulations	

In the following pages, each land use planning factor will be examined in relation to RFP. The narrative for each planning factor will begin with a presentation of information relative to the planning factor that is useful in the creation of a viable land use plan for RFP. This will be

followed by issues pertinent to each planning factor. Sources available for further research and/or information will be presented. Finally, the regulatory requirements, if applicable, will be presented. This information can then be assimilated and analyzed to create endstate scenarios for potential land uses at RFP.

To avoid redundancy, the regulations in Sections 3 and 4 have been simply listed after each planning factor except Regulations. The Regulations planning factor discussion includes an annotated list of the most salient land use related regulations contained in this document. For the sake of brevity, the regulations listed in this document are statutes and some of the major implementing regulations. Only the Federal Register Notices are dated, as the date is the easiest way to locate entries in the Federal Register.

ECOLOGICAL AND NATURAL FEATURES

Ecological and natural features, which are the natural components that make up land, directly and indirectly influence the ultimate use of a parcel of land. Together they create natural opportunities and constraints related to land use and land development. The ecological and natural features can be classified as either physical, ecological, or socio-physical and include the following: slope, soil type, geology, surface water and groundwater, wetlands, flood plains, mineral rights, vegetation species and habitats, wildlife species and habitats, historical and archaeological sites, and visual features.

It is important to note that there are no identified critical habitats for threatened and endangered species at RFP. However, the majority of the area within the three major drainages at RFP is potential habitat for both threatened and endangered plant and animal species. The Buffer Zone, which is unique due to the short and tall natural prairie grasses that exist on the site, extends to include the mountain and plain wildlife species that have been noted at RFP. Any development or changes to the RFP Buffer Zone will be considered and continually monitored to ensure the maintenance of this ecologically significant resource.

Current Jefferson County wildlife habitat planning goals for the North Plains area, as identified in *The North Plains Community Plan*, include:

- The preservation of riparian areas, waterways and their banks, and adjacent vegetation areas

- The protection of habitat, hunting, and nesting areas of threatened or endangered species, primarily birds of prey
- The preservation of unobstructed movement corridors for deer, elk, and other species
- The preservation of native and naturalized vegetation, particularly tallgrass prairie remnants
- The preservation of water quality in bodies of water used by wildlife
- The preservation of key open areas used by wildlife

Soil suitability also must be taken into account when evaluating land use alternatives. RFP contains some soils (sandy cobbly loams) that could constrain certain types of development because of shrink-swell characteristics. These factors will need to be identified and carefully evaluated before determining an endstate use. The *EG&G Rocky Flats Plant Land Use Manual* will be referenced when investigating land characteristics in the RFP Buffer Zone.

Climatic and visual features combined with other planning factors may preclude or encourage certain types of land uses. It is important to evaluate all the natural features of RFP in light of land use decisions.

Issues

Does the Environmental Statement prepared in April 1972 regarding the land acquisition of the Buffer Zone bind the future use of the Buffer Zone as a greenbelt?

At the time of land acquisition, it was implied that the existing Buffer Zone would be preserved as an "open space" or greenbelt. "This greenbelt would preserve and enhance the natural ecological state of the land" (*Environmental Statement—Land Acquisition,* April 1972). At the time of acquisition, the Colorado State Environmental Commission was proposing a greenbelt concept to prevent the merging of large metropolitan areas (Boulder and Denver).

What are the physical constraints for determining alternative endstates for RFP?

Steep slopes, flood plains, unsuitable soils, and wetlands all preclude certain types of land uses; land uses may also be discouraged for other reasons. These physical constraints will be identified for the entire

plant site and mapped so that natural land constraints are clearly identified for different types of land uses.

What are the socio-political constraints and opportunities for ecology and natural features?

Who will have the authority and responsibility for management of existing wildlife and native vegetation at RFP?

Sources

EG&G Rocky Flats. *Threatened and Endangered Species Evaluation: Rocky Flats Plant Site*. April 4, 1991.

EG&G Rocky Flats. *Biological Characterization of the Terrestrial and Aquatic Habitats*. September 1992.

EG&G Rocky Flats. *EG&G Rocky Flats Plant Land Use Manual: Technical Site Information for the RFP per DOE Order 4320*. Manual No. 5-21500-GD-END-.01. March 1993.

Regulations

Currently, RFP must comply with all applicable environmental regulations and conditions set by federal, state, and local regulatory authorities. Federal and state statutes that would apply to the ecological and natural features land use planning factors include the following:

Wildlife

- Bald and Golden Eagle Protection Act, 16 USC 668
- Endangered Species Act of 1973, 16 USCA 1531, as amended by Public Law 101-650
- Fish and Wildlife Coordination Act, 16 USCA 661
- Migratory Bird Treaty Act, 16 USC 703
- National Trails Systems Act, 43 CFR 8350
- Nongame, Endangered, or Threatened Species Conservation Act, CRS 33-2-101

Surface Water

- Clean Water Act, Section 404, 33 USCA 466
- Colorado Water Quality Control Act, CRS 25-8-101
- Safe Drinking Water Act, 16 USCA 300

General

- Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 USC 9601
- Federal Land Policy Management Act, 43 USC 1701
- National Environmental Policy Act (NEPA), 43 USCA 4321
- Natural Resource Damage Assessment, 43 CFR Part 11

In determining potential scenarios for endstate land uses, the appropriate rules and regulations will be analyzed to identify regulatory constraints. Some regulations may actually have the effect of identifying an alternative use for an area. For example, if a threatened or endangered species is found in an area with topographical and geological characteristics that would limit other types of development, the best use of that particular area could very well be an ecological preserve, based on the regulatory (Endangered Species Act) and natural features constraints identified.

Maps

The ecological and natural features for RFP have been digitally recorded in a geographic information system for analysis and display. This section contains maps for a selection of these ecological and natural features to illustrate some of the data available for analysis with the Integrated Planning Process (see the *EG&G Rocky Flats Plant Land Use Manual* for a more complete presentation of ecological and natural feature maps). Map 3–1 displays the 16 quadrants into which all individual data layers (e.g., slope, soils) have been referenced to facilitate Systems Engineering Analysis.

AIR

Although Colorado law does not explicitly tie air quality analysis to land use planning, the federal Clean Air Act (CAA) encourages siting of land uses and transportation routes in a way that minimizes exposure to **hazardous air pollutants** (HAPs) and avoid build-up of pollutants in **ambient** air. Manufacturing, power generation, construction/demolition, and environmental restoration are examples of activities that should be evaluated for air quality impacts on any future development at RFP.

Air pollution is produced in various ways. Mobile sources such as automobiles, trucks, and service vehicles create **particulates** (road dust, tire flecks, and small particles emitted from tailpipes) and emit carbon monoxide, nitrogen oxides, **volatile organic compounds** (VOCs), and some HAPs.

Mobile source air pollution is addressed by the U.S. Environmental Protection Agency (EPA) and the Colorado Department of Health (CDH) Air Pollution Control Division through a variety of programs, including vehicle inspections, oxygenated fuels, particulate control measures, and vehicle emission control devices. The air quality impacts of road siting and construction are addressed by the CDH Air Pollution Control Division and local governments through the Denver Regional Council of Governments' (DRCOGs') transportation planning process. Air quality implications arising from proximity to transportation corridors should be considered during land use siting decisions.

Stationary sources of air pollution (such as power plants, generators, manufacturing operations, painting operations, and laboratories) may emit **criteria pollutants** (carbon monoxide, sulfur dioxide, nitrogen dioxide, ozone precursors, lead, and particulates), HAPs (listed by name in applicable regulations), and stratospheric ozone depleters (refrigerants). EPA and the CDH Air Pollution Control Division regulate emissions of these pollutants through various permit programs. From a land use perspective, proximity to stationary sources of air pollution should be considered.

The 1990 Clean Air Act Amendments (CAAA) strengthened and expanded federal control of air pollution, especially in the areas of transportation, HAPs, and stratospheric **ozone depletion**. DRCOG and the Regional Air Quality Council (RAQC) are currently preparing new transportation and implementation plans that will address air quality impacts on a Denver metropolitan regional basis.

The Colorado State Legislature amended the Colorado Air Pollution Prevention and Control Act (CAPPCA) in 1992, authorizing the Colorado Air Quality Control Commission (CAQCC) and the CDH Air Pollution Control Division to create a statewide operating permit program for stationary sources. The CAQCC and the Air Pollution Control Division are currently revising Colorado Regulation No. 3 to include new federal operating permit requirements, to amend the existing construction permit program, and to develop new standards and reporting requirements for HAPs. Depending on endstate activities, air emissions from certain operations (e.g., manufacturing, power plant operations, and construction) at RFP will be regulated under this program.

Documents detailing air emissions at RFP include Air Pollutant Emission Notices (APENs) for criteria pollutants submitted to the CDH Air Pollution Control Division most recently in December 1992. APENs for hazardous air pollutants are currently under development and will be completed and submitted by December 1993. In addition, a detailed facilities assessment is currently under way to support preparation of RFP's operating permit application (which will be due in 1995).

Issues

How will the National Emission Standards for Hazardous Air Pollutants (NESHAPs) be applied to endstate uses?

The existing NESHAPs standard (40 CFR Part 61) requires that emissions of **radionuclides** to the ambient air from DOE facilities shall not exceed those amounts that would cause any member of the public to receive, in a year, an effective dose equivalent of 10 millirem. Federal regulations have not been proposed to define "a radionuclide major source" or "significant levels" of radionuclides. EPA is presently evaluating several options for determining an "acceptable level of risk" for radionuclide air emissions, with new regulations expected within the next several years.

Sources

Garrett, Theodore L. and Sonya D. Winner. "A Clean Air Act Primer." *Environmental Law Reporter.* March–May, 1992.

Houpt, Jefferson. "Colorado's New Clean Air Program." *Colorado Lawyer.* March 1993.

Marchant, G. and D. Danzeisen. "'Acceptable' Risks for Hazardous Air Pollutants." *Harvard Environmental Law Review*. Volume 13, p. 535. 1989.

Regional Air Quality Council. *Clean Air Act of 1990, Provisions of Title I*. December 1990.

Regulations

Land uses in certain endstate scenarios may trigger CAAA permit requirements. In general, any use involving manufacturing processes, fuel burning or storage, or the use of liquid chemicals may trigger federal CAAA and state reporting and operating permit requirements. Construction activities may also trigger Colorado permit requirements.

Primary CAAA provisions include:

- Title I - Air Pollution Prevention and Control
- Part A - Air Quality and Emission Limitations, Including Ambient Standards, New Source Performance Standards, and National Emission Standards for Hazardous Air Pollutants
- Part C - Prevention of Significant Deterioration of Air Quality
- Title V - Operating Permits
- Title VI - Stratospheric Ozone Protection

Federal Statutes and Regulations

- Clean Air Act (as amended, 1990), 42 USC 7401 et seq.
- 40 CFR Part 50—National Primary and Secondary Ambient Air Quality Standards
- 40 CFR Part 60—Standards of Performance for New Stationary Sources
- 40 CFR Part 61—National Emission Standards for Hazardous Air Pollutants
- 40 CFR Part 63—National Emission Standards for Hazardous Air Pollutants for Source Categories (Proposed)
- 40 CFR Part 68—Accidental Release Prevention (Proposed)
- 40 CFR Part 70—Operating Permit Program

- 40 CFR Part 82—Protection of Stratospheric Ozone (Proposed, Final Rules)

  — Subpart F, Refrigerant Recycling and Emissions Reduction

Colorado Statutes and Regulations

- Colorado Air Pollution Prevention and Control Act, 1992, CRS 25-7-101 et seq.
- Regulation No. 1—Emission Control Regulations for Particulates, Smokes, Carbon Monoxide, and Sulfur Oxides
- Regulation No. 3—Regulation Requiring an Air Pollutant Emission Notice, Emission Permit Fees
- Regulation No. 3—Construction and Operating Permits (in revision)
- Regulation No. 6—Standards of Performance for New Stationary Sources
- Regulation No. 7—Control Emissions of Volatile Organic Compounds
- Regulation No. 8a—Control of Hazardous Air Pollutants
- Regulation No. 8b—Emissions Standards for Asbestos
- Regulation No. 13—Reduction of Carbon Monoxide Emissions from Gasoline Powered Motor Vehicles Through the Use of Oxygenated Fuels
- Regulation No. 14—Reduction of Motor Vehicle Air Pollution from Alternative Fueled Vehicles and Retrofit Devices
- Regulation No. 15—Controlled Emissions of Ozone Depleting Compounds

Interagency Documents

- Interagency Agreement; U.S. Environmental Protection Agency, Colorado Department of Health, and U.S. Department of Energy, January 22, 1991.

DOE Orders

- General Environmental Protection Program, DOE Order 5400.1
- Environment, Safety and Health Program for DOE Operations, DOE Order 5480.1B

WATER

It is important to assess both surface water and groundwater during the analysis of facility/land use alternatives for two primary reasons: (1) a clean, available source of water must exist to ensure that necessary water needs are met for the ultimate endstate for RFP, and (2) the quality of water leaving the plant must be protected regardless of the endstate selected.

The federal government does not own any water rights for RFP. Raw (untreated) water is currently purchased from the Denver Water Board and delivered to the plant via either the South Boulder Diversion Canal or the Ralston Reservoir pipeline.

Surface Water

Surface water quality and management at RFP have been of concern to local cities, DOE, federal and state agencies, and the public due to the location of Great Western Reservoir and Standley Lake, the two drinking water supply reservoirs immediately downstream from the plant. There are four ephemeral streams originating on the RFP site: Rock Creek, North Walnut Creek, South Walnut Creek, and Woman Creek. In addition, there are four water ditches that cross RFP: Upper Church Ditch, McKay Ditch, the Kinear Ditch, and Smart Ditch (1 and 2). Most surface water flow is the result of precipitation; however, about 200,000 gallons/day are discharged from the RFP wastewater treatment plant into South Walnut Creek. Depending on the status of RFP, this water source may not be present in certain endstate scenarios.

There are 14 manmade ponds on the RFP site. The ponds have sufficient capacity to store the 100-year, 6-hour flood volume from contributing drainage areas and are used for spill control, water treatment, flow measurement, and water quality sampling. The eventual **decontamination** and **decommissioning** (D&D) that will occur at RFP will likely affect surface water management since some physical features, processes, and procedures designed to detect, contain,

and treat contaminants and contain overflows may be altered. A process is currently under way to consolidate the management and ultimate cleanup of the A, B, and C Series Ponds under CERCLA and the IAG as part of **Operable Unit** (OU) 6, which includes the north and south drainages of Walnut Creek, as well as the A and B Series Ponds (see Map 4-1, page 4–8).

Groundwater

There are three primary layers of groundwater below RFP, each of which can be considered a separate aquifer: the Rocky Flats **Alluvium** (from 10 to 100-feet thick), the Arapahoe Formation (about 120-feet thick), and the Laramie Formation/Fox Hills Sandstone (about 600-feet thick). Groundwater reaches the surface in the form of seeps and one natural spring (Antelope Springs). The alluvial aquifer is currently classified by the Colorado Water Quality Control Commission (CWQCC) as Domestic and Agricultural Use Quality and Surface Water Protection. The Arapahoe and Laramie/Fox Hills aquifers are classified as Domestic and Agricultural Use Quality. These designations would preclude industrial use of this water.

Wetlands

Currently, 107 acres of RFP have been designated as wetlands. These wetlands are primarily in the form of the 14 manmade ponds. In addition, there are 84,970 lineal feet of wetlands located along the creeks and their tributary water courses. Section 404 (b)(1) of the Clean Water Act (CWA) has established restrictions on the disturbance of wetlands. The U.S. Army Corps of Engineers and EPA will have jurisdiction for permitting wetlands activities. Based on their review of the permit application, the Corps of Engineers and EPA will either deny the permit or grant conditional approval with the requirement that a mitigation plan be submitted. Final permit approval is contingent upon approval of the mitigation plan.

Issues

Is there a sufficient raw water supply to support the selected endstate land use for RFP?

How will water rights be acquired and allocated?

Sources

EG&G Rocky Flats. *Draft Surface Water Management Plan.* (Unpublished.)

EG&G Rocky Flats. *Watershed Management Plan.* 1993.

EG&G Rocky Flats. *Environmental Compliance Plan.* 1993.

Regulations

- Clean Water Act, 33 USC 1251
- Colorado Water Quality Control Act, CRS 25-8-101
- Interagency Agreement; U.S. Environmental Protection Agency, Colorado Department of Health, and U.S. Department of Energy, January 22, 1991
- National Pollutant Discharge Elimination System, 40 CFR 122
- Safe Drinking Water Act, 42 USC 3005

INFRASTRUCTURE

The current infrastructure at RFP is extensive. It includes all the basic framework required to support the plant. This includes facilities, utility systems, fire protection systems, **sanitary waste** systems, sewer systems, landfills, lighting systems, transportation systems, parking lots, sidewalks, and fencing.

The infrastructure required today will change as the site evolves to an endstate use. Depending on the endstate selected, some, if not all, of the current infrastructure would be necessary and could be upgraded or replaced.

To be consistent with surrounding development, the following services must be considered when an endstate is selected:

- Adaptive use of existing structures and systems based on compatibility with surrounding development

- Fire protection relevant to the endstate use, including proximity of service, type of personnel (volunteer or paid), and the availability of water
- Emergency response for medical care, hazard teams, and disaster services
- Law enforcement, traffic control, and coordination of interagency efforts
- Utilities services for electricity, natural gas, and communication networks
- Water, sewer, and landfill services should have an identified management plan, including information on mineral rights and mining proposals

Jefferson County has adopted a design guidelines document as a companion to *The North Plains Community Plan* for assistance in achieving an "excellent site design" for development. This design guidelines document will serve as a primary reference during the infrastructure planning portion of future endstate identifications for RFP. Other community planning documents will be considered as necessary.

Issues

Who will maintain the RFP infrastructure if the selected endstate indicates a need for existing structures or services?

How will Individual Hazardous Substance Sites (IHSSs) and CERCLA designation impact the infrastructure maintenance?

How will infrastructure maintenance accommodate environmental restoration and remediation obligations?

Sources

Jefferson County, Colorado, Planning Department. *North Plains Community Plan: Jefferson County Design Guidelines.* May 10, 1989.

Site Development Planning, DOE Order 4320.1B

Capital Assets Management Process (CAMP), DOE Order 4320.2

Regulations

DOE Orders

- Real Property Management, DOE Order 4300.1C
- Maintenance Management Program, DOE Order 4330.4A
- Site Development Planning, DOE Order 4320.1B
- Capital Assets Management Process (CAMP), DOE Order 4320.2
- Project Management System, DOE Order 4700.1
- National Environmental Policy Act Compliance Program, DOE Order 5440.1E
- Safety of Nuclear Facilities, DOE Order 5480.5
- General Design Criteria, DOE Order 6430.1A

Standards and Guidelines

- American National Standards Institute
- American Society of Mechanical Engineers
- National Electrical Code
- National Electrical Manufacturer's Association
- National Fire Protection Association

TRANSPORTATION

The existing regional network of roads has developed around RFP so that it does not today block any major flows. Because of its size and location in a developing metropolitan area, however, RFP creates local and regional transportation challenges that would be typical of any large parcel of land in a similar location. The different land use scenarios that will be evaluated within the Integrated Planning Process will not only include different mixtures and placement of land uses but also the network of transportation that will serve the land uses. Streetways, highways, railways, pathways, as well as their users must be considered for each potential endstate. Transportation issues will be different based on the selected endstate land uses.

There is currently a substantial population base within a 10-mile radius of RFP (estimated at approximately 369,000 for 1989, using information from the Denver Regional Council of Governments). The existing transportation network in the northwest quadrant of the Denver metropolitan area becomes more burdened as the population grows. As a result of this growth, which has increased over the past decade, the cities of Arvada, Broomfield, Superior, and Westminster have expanded their boundaries toward RFP in order to supply land for the growing residential units and employment centers. In addition to the communities and subdivisions immediately around RFP, Boulder to the north and Golden to the south of RFP are also major employment and residential centers. With Denver to the southeast, RFP sits in a transportation triangle where people and goods flow in large and increasing numbers along each leg of the triangle. The network of local roads and transit services, as well as bike and pedestrian paths, must increase in capacity to accommodate the growth.

Both transportation services and facilities can serve existing development and induce future development. Thus, land use planning and transportation planning at RFP must go hand in hand. In fact, if a transportation link requires a wide buffer, the link may itself be considered a land use—transportation corridor. Future land uses at RFP may attract people or goods. Surrounding communities may vie for best access to some land uses while shunning others. Development in the surrounding area may create interest for access across RFP.

Issues

If the selected endstate includes institutional control of RFP, how will transportation be affected?

What will be the burden on existing transportation networks and services imposed by the selected endstate?

Who will build, maintain, and police the transportation system?

Sources

City of Boulder Planning Department and Boulder County Land Use Department. *The Boulder Valley Comprehensive Plan.* December 1990.

Jefferson County, Colorado, Planning Department. *The North Plains Community Plan.* April 1990.

U.S. Department of Energy. *1989 Population, Economic, and Land Use Data Base for Rocky Flats Plant.* August 1990.

Regulations

National Trails Systems Act, 43 CFR 8350

The endstate network of roads and other transportation infrastructure will serve the site as well as surrounding communities. This infrastructure will be developed according to the standards and practices established by state and local authorities that apply in surrounding communities. These standards are unlikely to influence decisions as to the use chosen for the site but should be considered when debating endstate land uses.

VISUAL ANALYSIS

RFP lies amidst a landscape that is mostly grazing land with low hills and ridges. The existing facilities are separated from neighboring public roads by the open land in the buffer area. Because access to the site is limited to authorized personnel, public visual access is limited to views from the outside. Visual quality has not been an issue of importance in the past. Visual analysis may, however, be an important element in land use planning because views of the site and from the site can contribute to public appreciation and concern. Large structures that will be seen often by many people will get much more scrutiny than small structures that will seldom be noticed.

Visual analysis of RFP has not begun. It is unclear how important it will be in evaluating alternative endstates. Whether or not visual analysis identifies significant issues during the planning for future endstates will depend on changes both onsite and offsite:

Onsite

- Size and location of new structures and uses
- Design of new structures and uses
- Changes in vegetation and wildlife habitat
- Grading or re-contouring of land
- Changes in roads and public access

Offsite

- Changes in amount, kind, and location of contiguous land uses
- Changes in neighboring roads and public access

The landowner, in this case DOE, has principal responsibility for determining visual quality of development. Surrounding communities are likely to be concerned with the visual impact of development at the RFP site. Their level of concern will depend on how visible new structures and activities are and how much they complement other structures and activities in the area.

Issues

Visual issues are most likely to arise in areas that are sensitive because of their prominence or special visual quality.

Which areas are visually prominent?

The first step to visual resource management of the site is an appreciation of the **topography**. Ridges and hills in the rolling terrain will be identified. Drainages that open out from the site toward neighboring property and public roads will also be identified. These topographic features offer the greatest potential visibility to future development. A public monument that should be visible, for example, would ideally placed on a ridge, whereas a factory would ideally be sited to avoid such prominence. Not all ridges and hills will be equally prominent. Places that are easily seen from a curve on a heavily traveled road will be more prominent than places that are seen mostly from private property with limited access. The viewpoints may change in importance and new ones may be added as the future of land uses and transportation around RFP becomes better defined.

Which are the best views?

The second step is to evaluate quality of views onto, within, and from the site. Some landscapes and views are more appreciated than others. Today, the character of the open spaces at RFP is similar to land in the vicinity. As development increases near the plant, the open spaces at the plant may become more important to the neighboring communities because these landscapes become less common. Through professional analysis and community discussion, the relative quality of local views can be assessed.

Which areas are visually most sensitive?

Visual prominence and visual quality will be combined to produce a map of visually sensitive areas. These visually sensitive areas will constrain some development and be an opportunity for others. Because an area is visually sensitive does not mean that it should not change. It may be the perfect place for a well-designed building—especially if it has public use. It may be a good place to enhance the landscaping, to develop a park, or to improve the agricultural use. As specific land use proposals emerge for RFP, the visual sensitivity map will guide the placement and design of structures and changes to the landscape.

Will RFP remain visually distinct?

The visual issues that will arise in discussions of future use of RFP are likely to center on the choice of land uses and on the role of the federal government. If risk to human health is reduced to an acceptable level throughout the site, the debate will remain as to whether the site should be developed to flow seamlessly into the communities that surround it or whether it should remain visually distinct. Thus, if RFP is eventually surrounded by residential development, should the plant site provide space for more housing, space for industry that could employ nearby residents, or for parks, open space, or a nature preserve; or should it remain an island of ranching amidst urban development? Surrounding communities may be divided on these issues. Economic factors may dominate the debate; however, visual arguments may also be important.

Should the federal government preserve and enhance the open views that most neighboring communities, with the exception of Boulder, are not able to provide for themselves due to their location in relation to RFP?

If intense development is to occur on the site, should it be seen as several small developments that become part of neighboring communities or as one large regional development?

Sources

Jefferson County, Colorado, Planning Department. *The North Plains Community Plan.* April 1990.

Regulations

There are no specific regulations covering visual quality of future development at RFP. However, it must be considered in reviews under the National Environmental Protection Act and may be a consideration for any development submitted for review under city or county land use regulations. There are no prescriptive regulations that dictate future land use based on visual quality. Visual quality is unlikely to be a determining factor unless very large and visible structures are proposed—an antenna, a smoke stack, a large office complex at the edge of the site. Even then, visual analysis may have more influence on how the project is carried out rather than whether or not it is carried out.

Visual resource policies and guidelines are stated in *The North Plains Community Plan*. They form a basis for visual resource management in the RFP area. Among the guidelines that apply to the RFP area are the following:

- Landscapes that have special qualities and are viewed by many people should be preserved
- Development in visually sensitive areas should be allowed only if its visual impacts can be adequately mitigated
- Visually sensitive areas include view corridors along Highways 93, 72, and 36
- Techniques that could be used to mitigate visual impact include clustering of structures, graduated or reduced building heights, separations between structures, setbacks, etc.
- Minimize or mitigate the silhouette effect of structures on ridge lines

ARCHAEOLOGY AND HISTORY

DOE is committed to the preservation and protection of historic and archaeological sites to maintain any significant links to the area's past. To-date, however, no sites have been determined eligible for inclusion in the National Register of Historic Places, although a historic trail and a proposed railroad bed have been noted.

The first recorded use of the land that is today known as Rocky Flats began during the Civil War and accelerated thereafter. Land patents were not issued until after the war in 1867, and, from that point on until the last 1930's settlement, patenting of the public domain continued. The length of time it took for all the lands to leave the public domain serves as an indicator of the comparatively low value settlers placed on the rocky lands. Rocky Flats became a stock raising area and essentially stayed as such until the lands came back under federal ownership in the 1950s for its present use.

The land on which RFP is built was purchased in 1951 by the federal government to meet criteria developed by the Atomic Energy Commission (AEC) for the manufacture of nuclear weapons components. Criteria for the site dictated that it have a 2-mile by 2-mile area, be 5 to 25 miles from a community with a population of at least 25,000, have a dry moderate climate, be near a good main highway, and be near a community airport served by major airlines. Rocky Flats was selected from over 35 competing sites located in Nebraska, Kansas, Oklahoma, Mississippi, Arkansas, Colorado, and the Texas Panhandle.

In 1972, additional acreage was acquired by the AEC to provide a one to one-and-one-half mile buffer zone around the existing industrial facility. The Buffer Zone, which was being used primarily for grazing purposes, would serve as an undeveloped open area around the industrial facility to preserve and enhance the natural ecological state of the land as well as provide an additional margin of safety in the highly unlikely event of a plant accident.

Issues

Was any legal guarantee made regarding future land use in the 1972 Environmental Assessment and purchase documents of the Buffer Zone?

Sources

Atomic Energy Commission. *Environmental Statement—Land Acquisition.* April 1972.

EG&G Rocky Flats. *An Archaeological and Historical Survey of Selected Parcels Within U.S. Department of Energy, Rocky Flats Plant and Northern Jefferson County, Colorado.* January 1, 1989.

EG&G Rocky Flats. *Cultural Resources Class III Survey of U.S. Department of Energy, Rocky Flats Plant, North Jefferson and Boulder Counties*. August 1, 1991.

Regulations

- National Historic Preservation Act of 1966, 16 USC 470
- Protection of Historic and Cultural Properties, 36 CFR Part 800

SOCIOECONOMICS

Land use decisions have a broad effect on social and economic conditions in an area. Potential social and economic effects should be considered in land use planning to help identify and mitigate the potential adverse impacts associated with changes in land use, although these effects would generally be considered after other limiting factors are identified. In this case, a socioeconomic analysis will be completed when potentially viable land uses have been identified in the endstate scenarios.

Impacts to be evaluated will include direct and indirect effects on the following:

- Population
- Employment
- Income
- Local and state government expenditure and revenue analysis
- Infrastructure and public services of surrounding communities
- Economic factors
- Housing
- Taxes

REGULATIONS

Land use planning for RFP is complicated by the need to balance public interest, the DOE mission, and requirements of the regulatory community. Of special concern are the requirements of the regulatory community, which must be considered regardless of the final endstate selected for RFP. Because of the presence on plant site of stored process waste and environmental contamination, there are specific laws and regulations that apply to the disposition of RFP land. Although the undeveloped land in the RFP Buffer Zone has historically been of little

economic value, its close proximity to the mountains and various water resources provides a rich ecological environment for wildlife and vegetation. This rich environment makes laws and regulations designed to protect certain wildlife and vegetation species of special concern in land use planning for RFP. Laws and regulations governing wetlands must also be considered, as there are extensive wetlands within the RFP boundary.

In land use planning, environmental considerations such as compliance with federal, state, and local laws; DOE orders; and legal agreements will affect the choice of the selected endstate scenario. The federal agencies involved in environmental compliance include the EPA, the U.S. Department of the Interior (DOI), the Department of Labor, the Department of Justice, DOE, and the Army Corps of Engineers. The Occupational Safety and Health Administration (OSHA) is the regulating authority for industrial safety for subcontractors performing work at RFP. In addition to federal agencies, state agencies such as CDH also have regulating authorities for certain statutes. Colorado is an authorized state (based on federal approval) for RCRA, parts of the Clean Air Act, and the National Pollutant Discharge Elimination System (NPDES), which is an implementing regulation under the Clean Water Act. This means that CDH could enforce standards that are more stringent than the federal standards, in which case the state regulation would have primacy. Generally, federal regulations have primacy.

The regulations that could significantly affect land use planning include the CWA, RCRA, CERCLA, and NEPA. The federal government regulates all land that it either owns or administers and, by virtue of its supremacy, is not subject to state or local control. Where it does regulate certain areas, a state may be subject to a direct state permitting process over and above, or in lieu of, the local legislation. Power to regulate land derives from the police power and is therefore vested with the state.

State law may require local governments to study the environmental effects of any action they consider taking, including the granting of approval for private land development. However, state legislatures have generally delegated the regulation of land to their cities and counties. Citizens can challenge local land decisions by the power of referenda. Land use is also influenced by zoning laws.

If land use scenarios are consistent with federal, state, and local laws, the next step is a review of property deeds. This review requires legal descriptions for all of the property in question. The deeds are examined

to determine the possible applicable restrictions such as limited water rights and easements for exploration of mineral rights. In some instances, covenants may remain, affecting the land despite changes in ownership.

The land and the property at RFP have been deeded to DOE. Once RFP land is declared surplus, DOE may deed the surplus land to the GSA in the future. The General Services Administration Acquisition Regulation (GSAAR) System was developed under the authority of the Federal Property and Administrative Services Act of 1949, as amended, 48 CFR 501, and applies to leases of real property. The specific regulations state that action must not be taken without legal counsel's prior written approval with respect to the disposal of surplus real property. Although there is no specific regulation regarding piecemeal transfers of land, the Community Environmental Response Facilitation Act amendment to CERCLA does establish procedures under which land might be transferred in a piecemeal fashion based on approval by EPA. DOE Order 4300.1C, Real Property Management, delineates the rules for disposing of real property.

Issues

Will future non-DOE owners or leasees become Potentially Responsible Parties (PRPs) under CERCLA if cleanup is not complete at the time of land transfer?

Has real property been assessed where no hazardous substances were stored, released, or disposed?

Have property deed restrictions or covenants been reviewed?

Have Record of Decision documents for CERCLA and RCRA operable unit closures been reviewed to determine established cleanup standards (i.e., risk assessment)?

Has a survey been conducted to determine the demand of private users for areas that are designated as operable units?

Will the surplus land be deeded to GSA?

Does cooperation exist within the regulatory community to accommodate the achievement of an endstate land use?

Sources

Federal Statutes and Regulations

Acquisition of Leasehold Interests in Real Property, 48 CFR 570

Acquisition Plans, 48 CFR 507.1

American Indian Religious Freedom Act, 42 USC 1996

Assignment of Claims, 48 CFR 532.8

Bald and Golden Eagle Protection Act, 16 USC 668

Certificates of Competency, 48 CFR 519.6

Clean Air Act, 42 USC 7401-7642

— Ambient Air Quality Surveillance, 40 CFR 53

— Emission Offset Interpretive Ruling, 40 CFR 51

— National Emission Standards for Hazardous Air Pollutants, 40 CFR 61

— National Primary and Secondary Ambient Air Quality Standards, 40 CFR 50

— Prevention of Significant Deterioration of Air Quality, 40 CFR 52

Clean Water Act, 33 USC 1251

— Criteria and Standards for NPDES, 40 CFR 125

— National Pollutant Discharge Elimination System (NPDES) Permits, Environmental Protection Agency, 40 CFR 122

Competition Requirements, 48 CFR 506

Comprehensive Environmental Response, Compensation and Liability Act, as amended, 42 USC 9605

— CERCLA Designation, Reportable Quantities, and Notification, 40 CFR 302

— Emergency Planning and Notification, 40 CFR 355

— National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR 300

— Toxic Chemical Release Reporting: Community Right-To-Know Act, 40 CFR 372

Contract Modification—General, 48 CFR 543.1

Debarment, Suspension, and Ineligibility, 48 CFR 509.4

Definitions of Words and Terms, 48 CFR 502

Endangered Species Act, 16 USC 1531

Federal Land Policy Management Act, 43 USC 1701

Fish and Wildlife Coordination Act, 16 USC 661

Forms, 48 CFR 553

General Requirements for Negotiation, 48 CFR 515.1

General Services Administration Acquisition Regulation System, 48 CFR 501

Hazardous Chemical Reporting: Community Right-To-Know Act, 40 CFR 370

Hazardous Materials Transportation Act, 49 USC 1472

Improper Business Practices and Personal Conflicts of Interest, 48 CFR 503

Prompt Payment, 48 CFR 532.9

Protests, Disputes, and Appeals, 48 CFR 533

Publicizing Contract Actions, 48 CFR 505

Request for Release of Classified Information, 48 CFR 504.470

Resource Conservation and Recovery Act, as amended, 42 USC 6905

— Corrective Action Programs, 40 CFR 264.100

— EPA Administered Permit Programs: The Hazardous Waste Permit Program, 40 CFR 270

— Hazardous Waste Management System: General, 40 CFR 260,

— Identification and Listing of Hazardous Waste, 40 CFR 261

— Interim Status Standards for Owners and Operators of Hazardous Waste TSD Facilities, 40 CFR 265

— RCRA Closure Plans, 40 CFR 264.112

— Standards Applicable to Generators of Hazardous Waste, 40 CFR 262

— Standards Applicable to Transporters of Hazardous Waste, 40 CFR 263

— Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal, 40 CFR 264

Safe Drinking Water Act, 42 USC 3005

— National Primary Drinking Water Regulations, 40 CFR 141

— National Secondary Drinking Water Regulations Implementation, 40 CFR 142

— National Secondary Drinking Water Regulations, 40 CFR 143

Solicitation Provisions and Contract Clauses, 48 CFR 552

Special Contracting Methods, 48 CFR 517

Subcontracting with Small Business, 48 CFR 519.7

Urban Land Use Act, 40 USC 531

Wild and Scenic Rivers Act, 36 CFR 297

State Statutes and Regulations

Colorado Air Pollution Prevention and Control Act, 1992, CRS 25-7-101 et seq., 5 CCR 1001-2

Colorado Air Pollution Prevention and Control Act, Regulation No. 1, 5 CCR 1001-3

Colorado Air Pollution Prevention and Control Act, Regulation No. 3, 5 CCR 1001-5,

Colorado Air Pollution Prevention and Control Act, Regulation No. 6, 5 CCR 1001-8

Colorado Air Pollution Prevention and Control Act, Regulation No. 7, 5 CCR 1001-9

Colorado Air Pollution Prevention and Control Act, Regulation Nos. 8a and 8b, 5 CCR 1001-10

Colorado Air Pollution Prevention and Control Act, Regulation No. 11, 5 CCR 1001-13

Colorado Air Pollution Prevention and Control Act, Regulation No. 12, 5 CCR 1001-15

Colorado Air Pollution Prevention and Control Act, Regulation No. 13, 5 CCR 1001-16

Colorado Land Use Act, CRS 30-28-133

Colorado Underground Storage Tank Act, 6 CCR 1007

Colorado Water Quality Control Act, 5 CCR 1002-2

Colorado Water Quality Control Act, 5 CCR 1002-3

Colorado Water Quality Control Act, 5 CCR 1002-4

Colorado Water Quality Control Act, 5 CCR 1002-7

Colorado Water Quality Control Act, 5 CCR 1002-8

Colorado Water Quality Control Act, 5 CCR 1003-1

Colorado Water Quality Control Act, 5 CCR 1003-2

Identification and Listing of Hazardous Waste, Colorado Hazardous Waste Act, 6 CCR 1007-3, Part 261

Interim Status Standards for Owners and Operators of Hazardous Waste TSD Facilities, Colorado Hazardous Waste Act, 6 CCR 1007-3, Part 265

Land Disposal Restrictions, Colorado Hazardous Waste Act, 6 CCR 1007-3, Part 268

Nongame, Endangered, or Threatened Species Act, CRS 33-2-101

Standards Applicable to Transporters of Hazardous Waste, Colorado Hazardous Waste Act, 6 CCR 1007-3, Part 262

Standards Applicable to Transporters of Hazardous Waste, Colorado Hazardous Waste Act, 6 CCR 1007-3, Part 263

Treatment, Storage and Disposal (TSD) Operator Standards, Colorado Hazardous Waste Act, 6 CCR 1007-3, Part 264

DOE Orders

Capital Asset Management Process, DOE Order 4320.2

National Environmental Policy Act Compliance Program, DOE Order 5440.1E

Physical Protection of Special Nuclear Material and Vital Equipment, DOE Order 5632.2A

Real Property Management, DOE Order 4300.1C

Site Development Planning, DOE Order 4320.1B

Regulations

Following is an annotated list of major laws and regulations that identifies regulatory agencies responsible for enforcing the requirements related to land use planning for RFP.

Federal Statutes and Regulations

American Indian Religious Freedom Act protects the rights of Native Americans regarding religious beliefs. This act should not have any bearing on land use plans unless an Indian artifact is discovered on the site. The regulating authority is DOI.

Bald and Golden Eagle Protection Act governs the protection of bald and golden eagles. The land use plan will have to document and possibly plan ways to mitigate impacts to migratory birds. The bald eagle (*Haligeetus leucocephalus*) has been identified as occasionally using habitat between 0.3 and 1.1 miles from RFP. The regulating authority is DOI.

Clean Air Act (sets standards for any stationary sources and the construction or modification of a facility and sets limits for hazardous air pollutants. The 1990 amendments added requirements for air toxics, ozone protection, and operating permits that will be implemented by individual states. RFP will also be subject to vehicle inspection and maintenance programs and alternative fuel fleet requirements that are currently being revised. The regulating authorities are the EPA and CDH.

Clean Water Act authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for discharges of dredged or fill material into waters of the United States (commonly known as 404 Permits). The DOE codified its dredge-and-fill regulations in 33 CFR Parts 320-330. Section 402 of the CWA authorizes the NPDES program. Decontamination and decommissioning activities could impact the NPDES permits and require RFP to file for a 404 or nationwide permit. The regulating authority is CDH.

Comprehensive Environmental Response, Compensation and Liability Act establishes a comprehensive federal strategy for responding to, and establishing liability for, releases of hazardous substances from a facility. Present owners and operators are liable for past releases. CERCLA activities are dictated by the Interagency Agreement (IAG). An amendment entitled the Community Environmental Response Facilitation Act was added to CERCLA October 19, 1992. CERFA requires that federal agencies identify real property where no hazardous substances were stored, released, or disposed. It also requires notification to the state of any lease that will encumber property on which any hazardous substance or any petroleum or its derivative was stored for one year or more, or known to have been released, and on

which the United States plans to terminate federal government operations.

Endangered Species Act, as amended by Public Law 101-650, governs the protection of threatened and endangered species and/or their critical habitats. A land use plan must document potential impacts to those species that have been identified in the Threatened and Endangered Species Site Evaluations. Potential habitat suitable for the diluvium lady's tresses, black-footed ferret, and other species of concern have been identified at RFP. Although the peregrine falcon was not observed at RFP, two historical nest sites are located within 10 miles. The *Peregrine Falcon Recovery Plan* discourages land use practices that would adversely alter the character of the hunting habitat or prey base within a 10-mile radius of a nesting site. The regulating authority is DOI.

Federal Land Policy Management Act establishes public land policy for the management and protection of public lands. Actions with respect to this act require coordination through the DOI. The regulating authority is DOI.

Fish and Wildlife Coordination Act provides for a nationwide program of wildlife conservation and rehabilitation and requires coordination between federal and state agencies on issues impacting fish and wildlife resources. The regulating authority is the U.S. Fish and Wildlife Service within DOI.

Floodplain Management and Protection of Wetlands Executive Orders govern the protection of wetlands and flood plains from adverse impacts. Regulations promulgated under 10 CFR Part 1022, Compliance with Floodplain/Wetlands Environmental Review Requirements, requires DOE to accommodate the requirements of E.O. 11990 through applicable NEPA procedures. These policies include the consideration of wetland factors in DOE planning and decision making, providing the opportunity for early public review of proposed actions and the preparation of wetlands assessments. There are approximately 107 acres of aereal wetlands and 84,970 feet of linear wetlands on the RFP site. The regulating authority is the U.S. Army Corps of Engineers.

Hazardous Materials Transportation Act defines requirements applicable to the packaging and transportation of hazardous materials. The regulations promulgated under this act also list and classify the materials that the DOT has designated as hazardous.

Intermodal Surface Transportation Efficiency Act requires that transportation improvement programs (TIPs) be consistent with the State Implementation Plans. A conformity determination will be required to show that TIPs do not cause or contribute to new violations of air quality standards, exacerbate existing violations, or interfere with the timely attainment or interim emission reductions. The endstate scenarios may impact the regional TIP.

Migratory Bird Treaty Act governs the protection of migratory bird species. The land use plan will have to document and possibly plan ways to mitigate impacts to migratory birds. The regulating authority is DOI.

National Environmental Policy Act, which is the nation's most comprehensive legislative and policy statement on protection of the environment, requires that federal agencies investigate the consequences of their proposed actions on human health and the environment. The regulating authority is the Council on Environmental Quality.

National Historic Preservation Act protects the nation's cultural resources. It may require a mitigation plan to describe ways to avoid disturbing land that has been placed on the National Register of Historic Places. The act was amended by the Archeological and Historic Preservation Act, which directs federal agencies to recover and preserve historic and archaeological data. It has also been amended by the Archeological Resource Protection Act, which requires a permit from DOI for excavation or removal of archaeological resources. The regulating authority is DOI.

National Trails Systems Act establishes a system of recreational trails. Federal agencies must evaluate planned projects for impacts to established or proposed trails, including state and local trails of importance. The regulating authority is DOI.

Resource Conservation and Recovery Act establishes requirements for treatment, storage, and disposal of hazardous and solid wastes. This act amended the Solid Waste Disposal Act, which sets requirements for the design, construction, operation, maintenance, and closure of solid waste landfills. The closure of certain RCRA-regulated units known as Solid Waste Management Units (SWMUs) will affect the possible uses of certain areas at RFP. Also, the contingency plans to minimize hazards from unplanned releases may affect parcels of land at the site. The Federal Facility Compliance Agreement (FFCA) II and the Residue Compliance Agreement 93-04-23-01 govern activities related to land

disposal restricted (LDR) wastes and residues. These agreements will affect land use plans because each agreement will require storage and treatment facilities. The regulating authority is CDH.

Safe Drinking Water Act protects drinking water supplies by setting contaminant limits and providing for enforcement. Monitoring requirements may have a minimal impact on land use. The regulating authority is EPA.

Urban Land Use Act establishes procedures to ensure that any land used or disposed of in an urban area is consistent with zoning and land use practices of the local governments and local planning agencies. If the area is considered an urban area, consultation with local planning agencies might be necessary. The regulatory authority is DOE.

Colorado Statutes and Regulations

Colorado Air Pollution Prevention and Control Act sets general provisions applicable to all emission control regulations, such as emission monitoring, performance testing, and upset condition regulations. The regulating authority is the CDH Air Quality Control Commission.

- Regulation No. 1, Emission Control Regulations for Particulates, Smoke, Carbon Monoxide, and Sulfur Dioxide, delineates monitoring, recordkeeping, performance testing, and notification requirements for particulates, smokes, carbon monoxide, and sulfur oxides.

- Regulation No. 3, Air Pollution Emission Notices, Emission Permits and Fees, defines a regulation requiring air pollutant emission notices, emission permits, and fees, including regulations for the Prevention of Significant Deterioration Program (PSD). The 1992 reporting requirements for emissions of hazardous air pollutants and extremely hazardous substances known as the "emergency rule" is also included in this section (25-7-114).

- Regulation No. 6, Standards of Performance for New Stationary Sources, sets standards of performance for new stationary emission sources.

- Regulation No. 7, Emission Control of Volatile Organic Compounds, sets standards for the control of VOCs.

- Regulation No. 8a and 8b, The Control of Hazardous Air Pollutants, sets controls for HAPs. The control of asbestos is included in this section. There is a Colorado-specific HAP list and the state act adds an additional 319 Colorado hazardous air pollutants.

- Regulation No. 11, Motor Vehicle Emissions Inspection Program, sets standards for the reduction of carbon monoxide emissions from gasoline powered motor vehicles through the use of oxygenated fuels.

- Regulation No. 12, Reduction of Diesel Vehicle Emissions, sets standards for the reduction of motor vehicle air pollution from diesel emissions.

- Regulation No. 13, Alternative Fueled Vehicles, sets standards for the reduction of motor vehicle air pollution from alternative fueled vehicles and retrofit devices.

Colorado Water Quality Control Act. The regulating authority is CDH.

- 5 CCR 1002-2 sets regulations for the state discharge permit system, including, but not limited to, terms and conditions of permits, water quality standards, hearings, and variances.

- 5 CCR 1002-3 sets effluent limitations for biological oxygen demand, total suspended solids, residual chlorine, pH, oil, and grease.

- 5 CCR 1002-4 provides an exemption for nuclear or radioactive wastes from the requirement for a permit under CRS 25-8-506.

- 5 CCR 1002-7 provides regulations controlling discharges to storm sewers.

- 5 CCR 1002-8 sets standards for surface water and groundwater as well as classifications and numeric standards for river basins. These include numeric standards for metals, inorganics, and biological parameters.

- 5 CCR 1002-18 requires the certification of federal licenses and permits (401 certifications).

- 5 CCR 1003-1 sets standards and reporting requirements for primary drinking water, including limits for turbidity, inorganics, organics (Article 6), and radioactivity (Article 7).

- 5 CCR 1003-2 sets regulations for water treatment plants and wastewater treatment operators.

Colorado Underground Storage Regulations, 6 CCR 1007, sets regulations for the installation, removal, and maintenance of underground storage tanks. The regulating authorities are CDH and the U.S. Department of Labor.

Colorado Hazardous Waste Act. The regulating authority is CDH.

- 6 CCR 1007-2 establishes regulations for sanitary landfills. RFP's sanitary landfill is currently operational. It is expected to be at capacity in approximately five years. The regulating authorities are CDH and the Jefferson County Health Department.

- 6 CCR 1007-3, Part 99 requires treatment, storage, and disposal owners and operators to file a notification of hazardous waste activities in order for CDH to track hazardous waste.

- 6 CCR 1007-3, Part 261-268 incorporates the standards listed in the federal requirements specified under RCRA.

Nongame, Endangered, or Threatened Species Conservation Act, CRS 33-2-101, establishes regulations for the protection of nongame, endangered, or threatened species and their critical habitats.

Legal Agreements

Interagency Agreement integrates federal and state regulatory requirements for remediation of potential radioactive, hazardous, and **mixed waste** contamination resulting from past operations at RFP.

DOE Orders

Capital Asset Management Process, DOE Order 4320.2, establishes the policy for the management of capital assets and for prioritization of capital asset resource requirements. The regulating authority is DOE.

National Environmental Policy Act Compliance Program, DOE Order 5440.1E, establishes procedures to implement NEPA within DOE. The regulating authority is DOE.

Physical Protection of Special Nuclear Materials and Vital Equipment, DOE Order 5632.2A, establishes the policy for the physical protection of SNM. It may impact land use plans. The regulating authority is DOE.

Project Management Systems, DOE Order 4700.1, establishes procedures for DOE project management controls. It requires coordination of various environmental reviews. The regulating authority is DOE.

Real Property Management, DOE Order 4300.1C, establishes the acquisition, use, and disposal of real property. This order delineates procedures to follow for the selection of appraisers, management of natural resources, and real property inventory. The regulating authority is DOE.

Site Development Planning, DOE Order 4320.1B, establishes policies and assigns responsibilities for the planning and development of DOE sites. The major requirements under this order include evaluating existing site conditions and new requirements and quantifying facility requirements. The regulating authority is DOE.

Section 4:
ROCKY FLATS RELATED FACILITY/LAND USE PLANNING FACTORS

In addition to the general land use planning factors that are applicable to any site, there are land use planning factors stemming from RFP's historical mission as a nuclear weapons production facility that must be considered in the development of potential endstate scenarios for RFP.

INTRODUCTION

In addition to the general land use planning factors that are applicable to any site, there are land use planning factors stemming from RFP's historical mission as a nuclear weapons production facility that must be considered in the development of potential endstate scenarios for RFP. These RFP-related planning factors are facilities, waste, contamination, risk assessment, technology development, and safeguards and security.

RFP was built in 1951 and began operations in 1952. In the past, RFP's primary mission was production of nuclear and non-nuclear components for nuclear weapons. The final products that were produced included component parts manufactured from uranium, **plutonium, beryllium**, stainless steel, and other metals. RFP was the only DOE facility that produced plutonium triggers (pits) for nuclear weapons. Production activities included metalworking, fabrication and component assembly, plutonium assembly, plutonium recovery and purification, and associated quality control functions. Facilities at RFP include all production buildings and support structures necessary to accomplish its mission. RFP also played a major role in the retirement of nuclear weapons by disassembling nuclear components and recovering the nuclear materials.

In January 1992, as a direct result of the changing world political climate and a desire to reduce the nation's nuclear weapons stockpile, the President of the United States indefinitely suspended new nuclear weapon warhead production. Subsequently, the Secretary of Energy announced suspension of all RFP plutonium production.

Also in response to the changing world political climate and economic considerations, DOE is currently developing plans for the proposed reconfiguration of the United States' nuclear weapons production complex into a "new complex that is less dispersed with smaller facility capacities." A recommended alternative in the proposed reconfiguration is the movement of all RFP nuclear production and plutonium recovery and purification processes to another DOE facility (or facilities). Consolidation of non-nuclear production activities will result in the movement of RFP non-nuclear production activities to other DOE locations.

As weapons program activities are phased out, RFP buildings and equipment that are currently being used to support the defense mission will become available to support environmental restoration and waste management activities and programs. In contrast to the diminishing role of activities related to nuclear weapons component production, RFP environmental restoration and waste management activities will grow. As RFP transitions from its former defense mission into one of sitewide environmental restoration and waste management, each building will be analyzed to determine its capability to support alternative activities.

FACILITIES

There are 436 structures on the plant site, of which 150 are permanent buildings and over 90 are temporary modular facilities used primarily for office space. The remaining structures are relatively small, temporary, or components of other systems on the site. The facilities at RFP have a combined total of approximately 3 million square feet of floor space. Some of these buildings have been used for non-nuclear, non-hazardous work; other buildings have been used throughout their history for the manufacture and production of parts that contain radioactive and hazardous materials. To ensure that the most cost-effective, best use of each facility is made, a facility assessment is under way. Before final disposition of these buildings can occur, all assignments must be completed; classified parts, documents, and/or **Special Nuclear Material** (SNM) must be removed; all hazardous and mixed wastes must be removed; and the buildings must be cleaned up to specified standards.

Relative risks to workers, the public, and environment; the generation of wastes from cleanup activities; and cleanup costs and time will all be

considered. In order to compare various endstates and their potential impacts, analyses will be performed, including facility characterization, material inventory, hazard assessment, hazardous waste (including mixed wastes) assessment, and alternative use determination. Additional information will be added to this document as activities in the SEA are completed.

Issues

What facilities will be needed to support the SNM and hazardous, radioactive, and mixed waste storage and reprocessing requirements at RFP?

Who will make the decision on long-term storage of SNM at RFP?

Will RFP be partially "delisted" under CERFA, and, if so, can facilities or infrastructure services still under CERCLA be utilized to support the "delisted" areas?

Sources

EG&G Rocky Flats. *FY93 Site Development Plan: Rocky Flats Plant.* March 1, 1993.

U.S. Department of Energy. *Rocky Flats Transition Plan, Report to Congress.* July 31, 1992.

Regulations

Capital Asset Management Process, DOE Order 4320.2

Comprehensive Environmental Response, Compensation and Liability Act, as amended, 42 USC 9605

General Design Criteria, DOE Order 6430.1A

General Plant Projects, DOE Order 4700.3

Real Property Management, DOE Order 4300.1C

Resource Conservation and Recovery Act, as amended, 42 USC 6905

Site Development Planning, DOE Order 4320.1B

WASTE

Current operations at RFP are influenced by requirements related to waste management. This influence is expected to continue through transition to the final endstate of the plant. Waste and waste storage are likely to affect the time frame over which the land use transition may occur. In addition, issues surrounding long-term storage and disposal of waste may impact final endstate decisions.

A variety of wastes, including sanitary, radioactive, hazardous, and mixed (both hazardous and radioactive) have been generated over the life of RFP. Since 1989, when Idaho closed its borders to incoming **radioactive waste** for storage, the removal of radioactive and mixed waste from the plant site to authorized treatment/storage/disposal facilities has largely been halted, resulting in an accumulation of waste inventory. **Hazardous waste** continues to be shipped offsite for treatment and disposal, and sanitary waste is disposed onsite in the sanitary landfill. The plant is currently operating under a Federal Facility Compliance Agreement to reach compliance with the RCRA **land disposal restrictions**.

Assuming the currently accumulated waste has been shipped offsite, waste management will only be considered an issue if waste continues to be generated. Following are discussions of the major waste types at RFP and the types of waste management activities that will be necessary in the future.

Transuranic (TRU) and TRU-mixed waste will be sent to the Waste Isolation Pilot Plant (WIPP) for disposal beginning in 1999, according to current timetables. DOE, which has received a 10-year conditional **no-migration determination** (effective November 14, 1990) for disposal of TRU-mixed waste at WIPP, has made a planning assumption that a permanent no-migration determination will be obtained. Based on this assumption, conformance with RCRA land disposal restrictions (LDRs) will not be necessary for TRU-mixed waste, although some of both TRU and TRU-mixed waste will need to be treated and/or repackaged in order to meet transportation and WIPP requirements. Both treatment and transportation will continue to affect the site and, to a lesser extent, the surrounding area until all TRU and TRU-mixed waste has been removed. Careful selection and design of treatment processes and facilities and transportation routing will be necessary to minimize the impacts to contiguous land use.

Low-level waste will be shipped to the Nevada Test Site (NTS) for disposal and, in most cases, will not require treatment. Shipments of low-level waste to NTS have already begun. Because the requirements for disposing low-level waste are fewer than for low-level mixed waste, offsite shipment of this waste should proceed more quickly and have a minimal impact on land use in the near future.

Low-level mixed waste will have to be treated to meet the RCRA LDRs before offsite disposal will be possible. For some waste streams, this treatment may occur at offsite facilities (other DOE sites or commercial facilities). However, current plans include development of treatment capacity at RFP. The NEPA process will be used to ensure that this development complies with environmental regulations.

Residues are process by-products that contain high levels of radioactive materials. Processes to recover and stabilize the residues will be evaluated. These processes may produce additional low-level and TRU wastes as well as stable plutonium compounds. As long as the material remains onsite, safeguard and security operations will be necessary to ensure safe storage of this material.

Hazardous waste that has not been radioactively contaminated is currently being shipped offsite for proper treatment and disposal. These activities will continue until the backlog of hazardous waste is gone.

Sanitary waste continues to be added to the existing sanitary landfill and will continue as long as plant operations continue. The landfill has been engineered to meet all county, state, and federal requirements.

Issues

What if long-term storage or disposal sites for radioactive and mixed waste do not become available as expected?

What if efforts to develop waste and residue treatment technologies do not proceed successfully and in a timely manner?

Sources

EG&G Rocky Flats. *RFP Mission Transition Program Management Plan*. March 11, 1993.

U.S. Department of Energy. *Rocky Flats Plant FY94-FY98 Five-Year Plan*. 1992.

U.S. Department of Energy. *Rocky Flats Plant Roadmap FY92 Low-Level and Low-Level Mixed Waste Assessment Volume and Analysis and Issue Resolution Volume.* February 28, 1992.

U.S. Department of Energy. *Rocky Flats Plant Roadmap FY92 Residue and Mixed Residue Waste Assessment Volume and Analysis and Issue Resolution Volume.* June 29, 1992.

U.S. Department of Energy. *Rocky Flats Plant Roadmap FY92 TRU and TRU-Mixed Waste Assessment Volume and Analysis and Issue Resolution Volume.* June 29, 1992.

U.S. Department of Energy. *Rocky Flats Transition Plan, Report to Congress.* July 31, 1992.

U.S. Department of Energy. *Rocky Flats Plant Fiscal Year 1993 Site-Specific Plan Summary.* January 29, 1993.

Regulations

CERCLA Requirements, DOE Order 5400.4

Clean Air Act Amendments, 42 USC 7401

Environmental Compliance Issue Coordination, Environmental and Waste Management Assessment and Compliance, DOE Order 5400.2A

Hazardous and Radioactive Mixed Waste Program, DOE Order 5400.3A

Hazardous Materials Transportation Act, 49 USC 1472

Intermodal Surface Transportation Efficiency Act, 58 FR 3768, January 11, 1993

Resource Conservation and Recovery Act, as amended, 42 USC 6905

CONTAMINATION

Contamination by radioactive or hazardous substances has not been a traditional land use planning factor but is one that must be addressed in the development of potential endstates for RFP. Contaminated areas at RFP were originally grouped into 178 Individual Hazardous Substance Sites (IHSSs) to facilitate planning and administration.

These IHSSs were eventually prioritized by RFP, in consultation with EPA and CDH and in response to public comment, into 16 operable units (See Map 4-1).

Contamination has been detected in the environment at RFP in the form of various radionuclides, nonradioactive metals, VOCs, semi-volatile organic compounds, and inorganic ions. These substances have been released to the environment through past waste management practices and unplanned events such as leaks, spills, and fires.

Following a major plant expansion initiated in 1955, contaminated liquid and solid waste was produced at a faster rate than ever before. Storage and disposal of the increased amount of waste required the implementation of some waste management practices that have now been deemed detrimental to the environment.

A 1957 fire in Building 771, a plutonium recovery facility, caused the **plenum** filters to be breached, resulting in airborne releases. These releases were exacerbated by fire-fighting efforts and cleanup activities.

A 1969 fire in Buildings 776 and 777 was responsible for the spread of contamination into the buildings, the surrounding asphalt and soil, and the atmosphere. Contaminated fire wastes produced by cleanup activities were stored and/or disposed of at RFP. The contaminated fire wastes disposed of at RFP were considered at the time of disposal to be below the level of regulatory concern.

A sitewide radiometric survey was performed from 1977 to 1984 to detect "hot spots" or relatively highly contaminated areas of the plant site. By 1984, over 11 million square feet (approximately 250 acres) of RFP had been surveyed and relative concentrations of plutonium in the **surficial** materials had been identified and mapped.

The IHSSs at RFP so far have been characterized predominantly on the basis of historical information, as field investigation activities have not yet begun at many of the 16 RFP OUs. As a result, detailed information regarding the existence, concentration, and extent of contamination for many of the IHSSs is currently unavailable. Field investigations, however, have begun at the highest priority OUs, and substantial preliminary data are available for those sites. The RCRA Facility Investigation (RFI)/CERCLA Remedial Investigation (RI) activities have not been completed at any OU, and final contaminant reports are still pending.

The identification, investigation, and remediation of RFP IHSSs and the decontamination and decommissioning (D&D) of facilities will be conducted by DOE through the Environmental Restoration (ER) Program.

Issues

How clean is clean?

Cleanup standards are established on a site-specific basis, using the results of site risk assessments and applicable or relevant and appropriate requirements (ARARs) determinations. As a result of the uncertainty regarding the future endstate for RFP, EPA and CDH have presumed use of the most conservative exposure scenario ("onsite residential") in the human health risk assessment required under the IAG. This scenario is intended to establish basic risk assessment assumptions regarding exposure routes, exposure times and duration, and affected populations. The regulatory agencies have also emphasized their preference that remedial action alternatives developed through the Corrective Measures/Feasibility Study attain the 1 in 1 million lifetime added cancer risk (1E-6) target established in the National Contingency Plan (NCP). CDH routinely uses the 1E-6 standard as its RCRA "clean closure" performance standard. The NCP allows agency discretion within a risk range of 1E-4 through 1E-6 on a site-specific basis.

Is it feasible to remediate the site to the level of risk dictated by the preferred future uses selected for RFP?

What are the constraints imposed on potential types of development by the presence of contamination?

Sources

U.S. Department of Energy. *Historical Release Report for the Rocky Flats Plant, Final.* May 29, 1992.

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U.S. Environmental Protection Agency, Colorado Department of Health, and U.S. Department of Energy. *Interagency Agreement.* January 22, 1991.

U.S. Environmental Protection Agency. *Compendium of Superfund Field Operation Methods.* September 1987.

U.S. Environmental Protection Agency. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final.* October 1988.

U.S. Environmental Protection Agency. *Guidance on Preparing Superfund Decision Documents: The Proposed Plan and Record of Decision.* March 1988.

U.S. Environmental Protection Agency. *RCRA Facility Investigation Guidance, Interim Final.* May 1989.

Regulations

- Comprehensive Environmental Response, Compensation and Liability Act, as amended, 42 USC 9605
- Integration of Environmental Compliance Processes, DOE Order 5400.4
- Interagency Agreement, U.S. Environmental Protection Agency, Colorado Department of Health, and U.S. Department of Energy, January 22, 1991
- National Environmental Policy Act, 42 USC 4321
- Resource Conservation and Recovery Act, as amended, 42 USC 6905
- Community Environmental Response Facilitation Act, PL 102-426
- Emergency Planning and Community Right-to-Know Act, 42 USC 11001
- Standards for Protection Against Radiation, 10 CFR 20
- Radiation Protection of the Public and the Environment, DOE Order 5400.5 (change 2)
- Radiation Protection for Occupational Workers, DOE Order 5480.11

- Occupational Safety and Health Program for DOE Contractor Employees at GOCO Facilities, DOE Order 5483.1A

CERCLA and RCRA represent the principal regulatory requirements governing remedial actions at RFP. Both CERCLA and RCRA require the investigation, characterization, and remediation of hazardous waste sites and hazardous substance spills and releases.

CERCLA and RCRA are implemented at RFP through the IAG, which was negotiated between DOE, EPA, and CDH and signed on January 22, 1991. The IAG, which is a legally binding document that integrates the requirements of federal and state regulators, details requirements for remediation of potential radioactive, hazardous, and mixed waste contamination resulting from past operations within the 178 IHSSs. The IAG establishes milestones and schedules for remediation activities at RFP and specifies penalties for noncompliance.

Although joint EPA and CDH review exists for each operable unit at RFP, each operable unit is assigned to a lead regulatory agency. The lead agency was assigned based on the effective date of the 1980 RCRA regulations. Sites operating when these regulations went into effect required interim status under RCRA to continue operation, placing them under CERCLA and the jurisdiction of CDH. Sites not operating when the 1980 RCRA regulations went into effect were placed under EPA jurisdiction. The agency that is not assigned direct authority serves as the support regulatory agency.

Because RCRA allows EPA to delegate regulation of hazardous waste to approved state programs, EPA has granted authority to CDH to regulate RCRA sites under the Colorado Hazardous Waste Act (CHWA). Based on this authority, CDH is the lead agency for the majority of RCRA activities at RFP. EPA is the lead agency for the remaining OUs. OUs 1, 2, and 8 were assigned in the IAG to joint lead agency oversight by EPA and CDH.

The National Environmental Policy Act, which requires federal agencies to consider the impact of their actions on human health and the environment, requires the preparation of an Environmental Impact Statement (EIS) for major federal actions that could significantly affect the environment. The need to prepare an EIS is usually determined during the **Environmental Assessment** (EA), which is also a NEPA document. NEPA requirements for remedial actions at RFP are met by conducting an EA for each OU that may require remediation. Pursuant to the Interagency Agreement, EAs at the Rocky Flats Plant

are conducted simultaneously with the CERCLA and RCRA processes to avoid any impact on the schedules for completion of these processes.

RISK ASSESSMENT

Risk assessment is a term generally used to refer to the characterization of the potential adverse effects to human health or the environment as a result of exposure to hazards. Risk assessments are formal studies used to assist decision makers in managing risks. They provide valuable information that is used to assess the benefits versus the risk that might result from an action. There are various types of risk assessments that are performed; however, they all require the study of three issues: (1) the toxicity of the materials, (2) the manner in which people or the environment are exposed to the materials, (3) the consequences of potential health effects if people or the environment are exposed.

Historically, risk assessment has been extensively used at RFP to guide decision makers in NEPA assessments, safety analyses, and CERCLA cleanups. During the transition of RFP from its present configuration, through cleanup, and into final disposition, decision makers must be able to identify and quantify potential impacts to human health and the environment from planned actions. Additionally, as endstate scenarios are selected for consideration, risk analyses will assist decision makers in determining the potential impact from the proposed scenario to the RFP worker, the public, and the environment.

The Comparative Risk Analysis approach investigates the human health and ecological impacts associated with achieving a certain endstate. Knowing the relative risks provides an improved basis for development of risk management strategies.

Comparative Risk Analysis for Remediation/D&D Activities will evaluate priority setting and risk reduction techniques. Effective risk management decisions can be achieved through risk characterization communications between technical personnel and environmental managers.

DOE Order 5400.5, Radiation Protection of the Public and the Environment, identifies the DOE public dose limit from all exposure modes and all DOE sources of radiation. The exposure of members of the public to radiation sources as a consequence of all routine DOE activities shall not cause, in a year, an effective dose equivalent greater

than 100 millirem. This DOE order specifies that dose evaluations should reflect realistic exposure conditions.

DOE Order 5400.5 also addresses airborne emissions from all DOE sources of radionuclides. To the extent required by the Clean Air Act, the exposure of members of the public to radioactive materials released to the atmosphere as a consequence of routine DOE activities shall not cause members of the public to receive, in a year, an effective dose equivalent greater than 10 millirem.

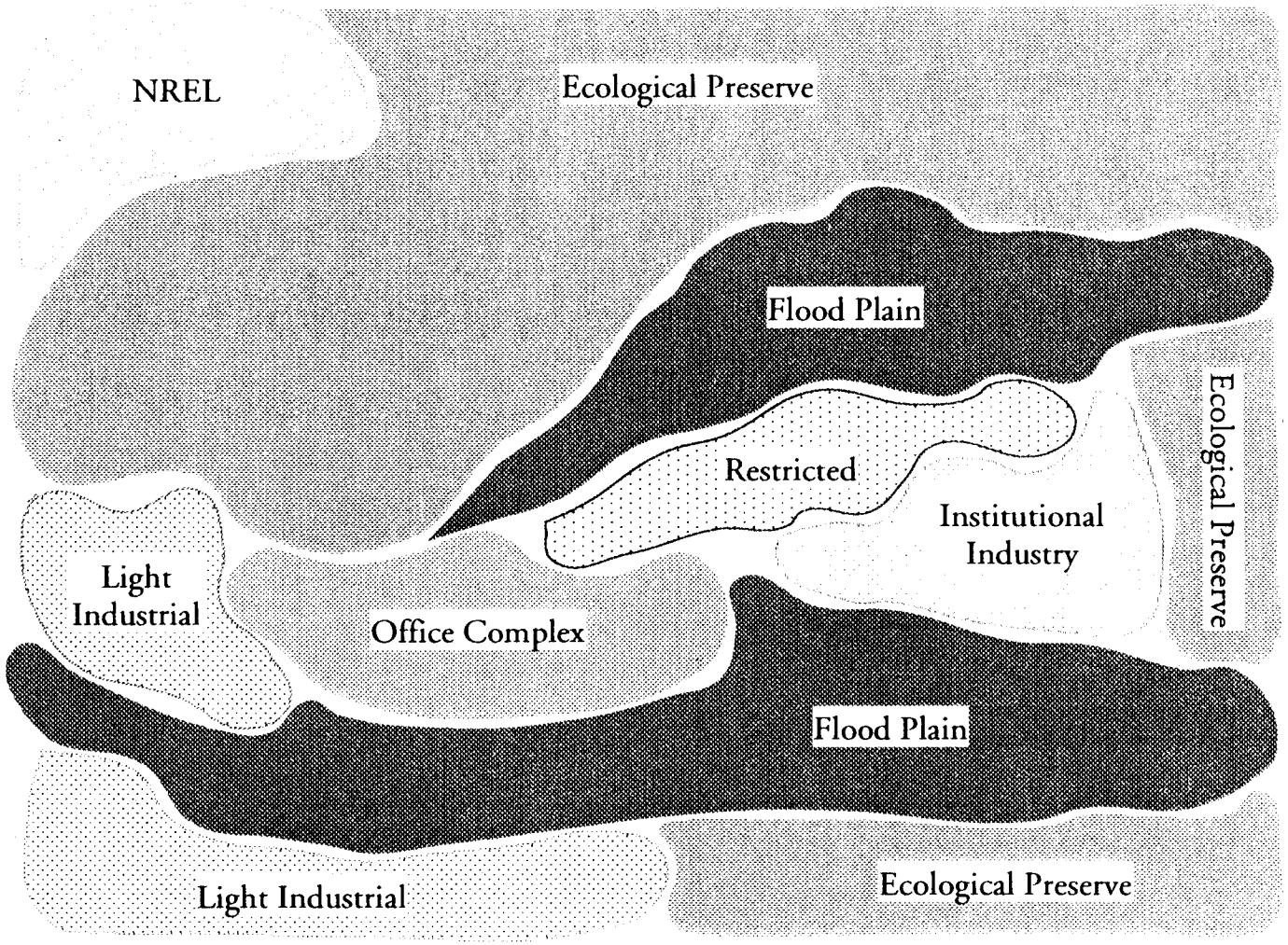
The selection of a future land use scenario initiates the risk assessment process. The future land use serves as the basis for identifying potential exposure pathways and identification of potential receptors, both human and biotic. There are many possible future land uses. However, RFP SEA is currently addressing three generic future land uses. These are (1) institutional control (restricted), (2) unrestricted use, and (3) a land use scenario that is a combination of the previous two (intermediate). The intermediate scenario presented in this section is for illustrative purposes only.

Example Endstate: Institutional Control (See Figure 4–1)

Institutional controls may be applied to limit or prevent exposures to contaminants and to ensure that a selected land use characterized by less stringent remediation levels does not change in the future. Institutional controls are legally enforceable measures or actions that may be used to supplement engineering controls to prevent or limit exposures to contaminants at a site in order to ensure protection of human health. Section 300.430 of the National Contingency Plan states that institutional controls may be implemented during the conduct of the Remedial Investigation/Feasibility Study, as part of a response action, and as a component of a final remedy. Some examples of institutional controls include restrictions to site access such as fencing and guards, restrictions on water well use or installation, restrictions on the type of future land use for the site (deed restrictions), and permitting programs that require notification and approval of local governments prior to restricted activity such as excavation.

The EPA specifies that if a land use assumption that is less conservative (i.e., leads to higher risk-based concentrations) than another is used, it generally will be necessary to monitor the future uses of that site. For example, if residential land use is not deemed appropriate for a particular site because local zoning laws prohibit residential development, any changes in local zoning would need to be

Example Endstate: Institutional Control



All Target Human Health Risks: $<1x10^{-4}$ LCF

Figure 4-1

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monitored. Such considerations should be clearly documented in the site's CERCLA Record of Decision.

In general, it should be assumed that residential areas remain residential. Sites that are surrounded by operating industrial facilities can be assumed to remain industrial areas unless there is an indication that this is not appropriate. Lacking site-specific information (e.g., at scoping), it may be appropriate to assume residential land use. This assumption will generally lead to conservative (e.g., lower concentration) risk-based Preliminary Remediation Goals. If not enough site-specific information is readily available at scoping to select one future land use over another, it may be appropriate to develop a separate set of risk-based Preliminary Remediation Goals for each possible land use. When the cumulative current or future baseline cancer risk for a medium is within the range of 1E-6 to 1E-4, a decision about whether or not to take action is a site-specific determination.

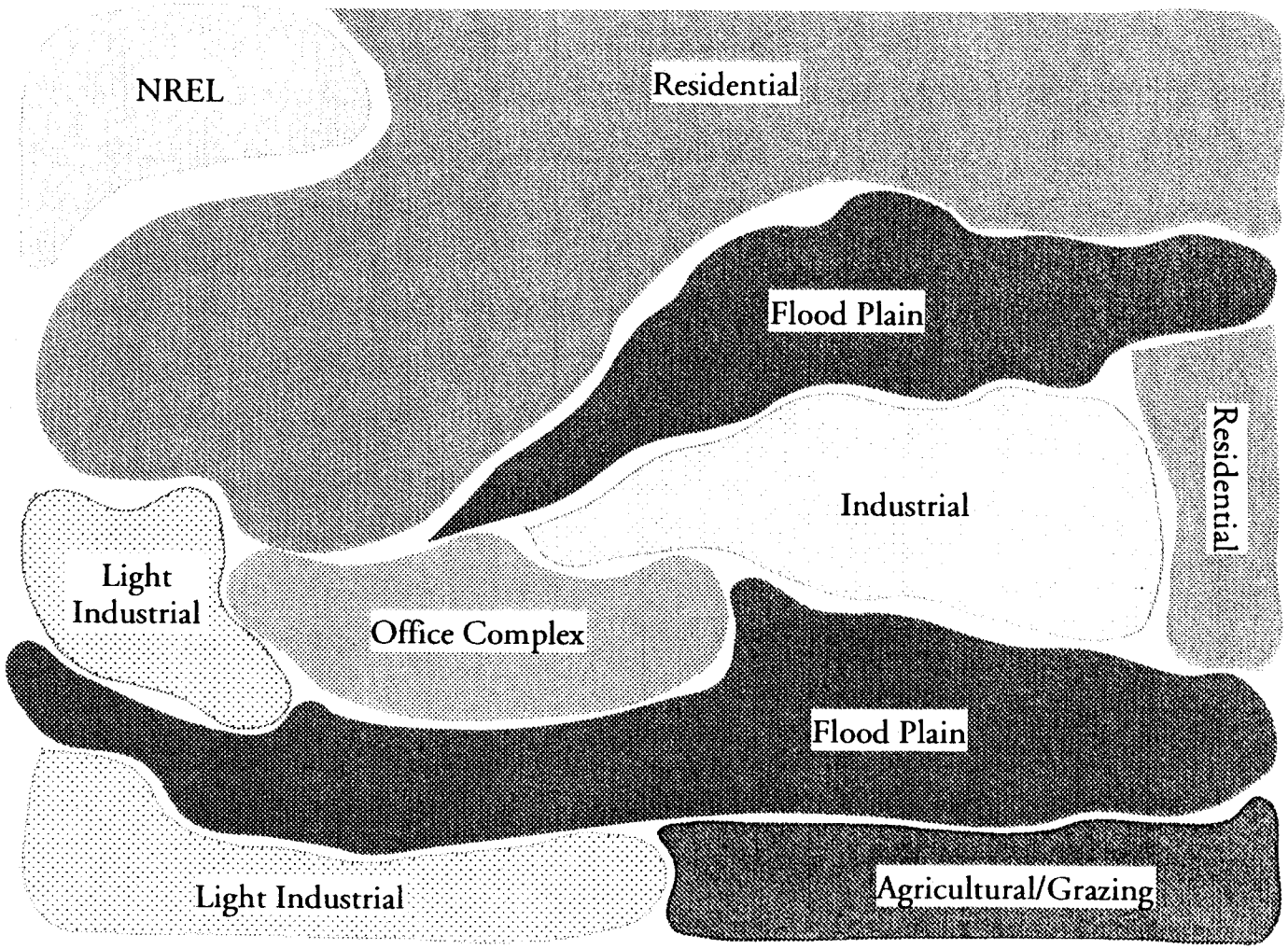
Example Endstate: Unrestricted Use (See Figure 4–2)

In remediation activities, land use establishes a basis for identifying potential exposure pathways and estimating contaminant uptake by human and ecological receptors. At DOE installations, where current access is greatly restricted, access under a future use scenario may be less restrictive. For the unrestricted use scenario, the contaminated media are restored to a pristine state or to conditions that will support unrestricted land uses.

The unrestricted alternative may lead to a residential exposure scenario, an agricultural farm family and farm work exposure scenario, or recreational exposure scenario. Residential exposure scenarios and assumptions should be used when there are or may be occupied residences on or adjacent to the site. Under this land use, residents are expected to be in frequent contact with contaminated media. The contamination may be on the site itself or may have migrated from it. The assumptions in this case account for daily exposure over the long term and generally result in the highest potential exposure and risk. Another factor that may require consideration could be contamination of the residential water supply, which could increase the potential for exposure during household uses, such as cooking and showering.

The agricultural farm family and farm worker scenario addresses exposure to people who live on the property and agricultural workers. The farm family scenario should be evaluated only if it is known that such families reside in the area. Consumption of home grown foods

Example Endstate: Unrestricted Use



All Target Human Health Risks: $<1x10^{-6}$ LCF

Figure 4-2

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produced on contaminated soils need not be evaluated at all sites. However, this pathway must always be considered when appropriate.

The recreational scenario addresses exposure to people who spend a limited amount of time at or near a site while playing, fishing, hunting, hiking, or engaging in other outdoor activities. This definition includes what is often described as the "trespasser" or "site intruder" scenario. Because not all sites provide the same opportunities, recreational scenarios must be developed on a site-specific basis.

Increased access will typically result in higher exposures and correspondingly higher risk to human and ecological receptors. Because of its potential impact on human health and environmental risk assessments, the selection of future land use scenarios profoundly affects the derivation of remediation goals. Unreasonable or inappropriate future land use scenarios could result in unattainable risk-based remediation goals and inefficient use of resources committed to remediation activities.

With regard to environmental restoration programs conducted under the authority of RCRA, DOE Order 5400.4 requires that response actions to contaminant releases not be inconsistent with CERCLA. Therefore, consideration of future land use scenarios to be used in baseline risk assessment can be applied to RCRA remedial activities as well. Information from *A Decision Analysis Framework for Selecting Future Land Use Scenarios to be Evaluated in Environmental Restoration Programs, Preliminary Draft, April 21, 1993,* will be used as appropriate.

Example Intermediate Endstate: Institutional Control/Unrestricted Use Combination (See Figure 4–3)

This hypothetical intermediate land use scenario involves a combination of the previous two land use scenarios. (The example intermediate land use depicted in Figure 4-3 is solely to aid the discussion of risk assessment contained in this section; the actual FY93 intermediate land use scenario to be used to test the Systems Engineering Analysis is described in Section 5.) While it may be the least costly to obtain, it may be the most intensive from an analysis point of view. Under commercial/industrial land use, risk of the contaminant from soil is assumed to be due to direct ingestion, inhalation of volatiles from the soil, and inhalation of particulates from the soil. For this type of land use, it is assumed that there is greater potential for use of heavy equipment and related traffic in and around contaminated soils. This leads to greater potential for soils to be

Example Endstate:
Institutional Control/Unrestricted Use Combination

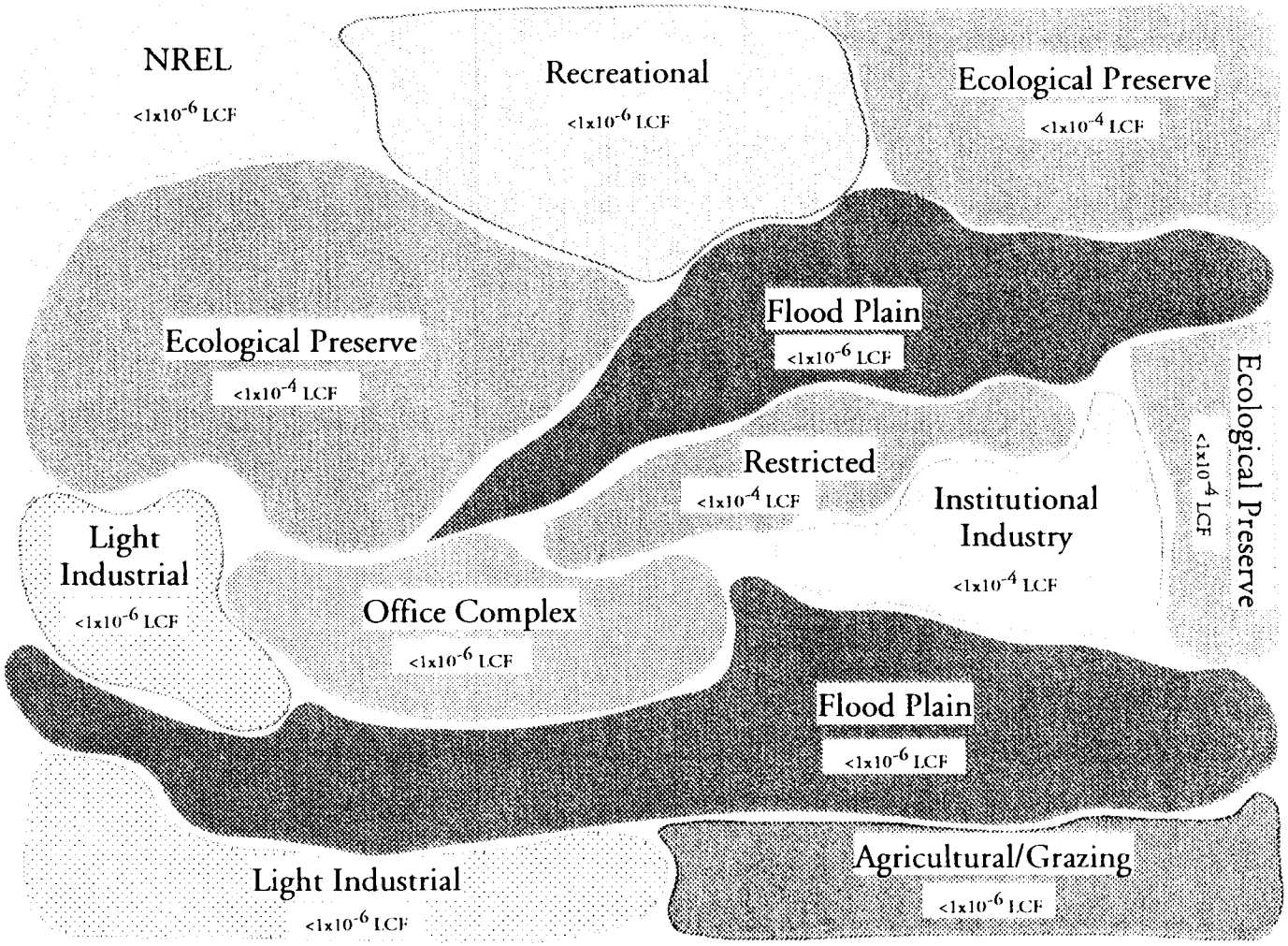

Figure 4-3

disturbed and produce particulate and volatile emissions than in most residential land use scenarios. The above assumption means that occupants or visitors to land areas with different land use assumptions may be impacted by activities from the commercial/industrial activities. Their cumulative risks may increase.

For this intermediate land use scenario, post-closure monitoring and sampling would be performed at the various other land use areas. Periodic revisitation of the land use risk analyses should be performed. It should be noted that many disciplines not directly required for risk analysis are required to select a future land use scenario. Much of this information would typically be generated as part of EIS efforts, and the Natural Resource Damage Assessment (NRDA) process should also yield relevant information.

Issues

What are the consequences of risk reduction?

As part of carrying out their risk management responsibilities, regulators and decision makers must weigh the benefits and risks associated with proposed actions. Which risk should be favored over another risk? Site cleanup, offsite transfer of nuclear materials, and onsite transfer of nuclear materials will all carry a defined risk. Communicating the defined risks associated with a proposed action to the public and gaining public acceptance will not be an easy task. Cleanup actions and potential endstate scenarios will both be influenced by public perception of the potential hazards and their associated benefits.

Sources

Many existing RFP documents contain risk assessment information. These documents include Safety Analysis Reports, operable unit Remedial Investigation/RCRA Facility Investigation reports, NEPA documentation such as the *1980 Site-Wide Environmental Impact Statement* and operable unit Environmental Assessments. However, all current risk documentation provides risk data for an operation or a contaminant. They do not provide comparative integrated risk information.

Regulations

Comprehensive Environmental Response, Compensation and Liability Act, as amended, 42 USC 9605

National Environmental Policy Act, 43 USCA 4321

Resource Conservation and Recovery Act, 42 USC 6905

TECHNOLOGY DEVELOPMENT

New and innovative technologies will be introduced over the life of this analysis. Engineering analysts will supply a work plan to show the impact of the new technology. If the technology promises a desirable impact, an analysis will be conducted regarding the availability of the technology based on immediate, 10-year, or 100-year availability. New technologies will be incorporated into the SEA model as they become available.

Issues

Who will take the lead for technology development projects and determinations?

How can new technologies be introduced at RFP?

How will the timing of development of new technologies affect the selection of endstates?

Sources

EG&G Rocky Flats. *FY93 Annual LDR Progress Report*. March 31, 1993.

Regulations

Federal Facility Compliance Act, 42 USC 6961

SAFEGUARDS AND SECURITY

The Facility/Land Use Component presents three preliminary endstates for RFP: restricted access, unrestricted access, and an intermediate state that will include both restricted and unrestricted areas. The level of safeguards (nuclear materials accountability and

control) and security required for the protection of the United States Government's assets is totally dependent on the remaining assets. Under the first endstate (the restricted use of RFP), DOE and EG&G would continue to employ the site-specific protection program that is currently in place to protect the United States Government's assets. These materials and documents are vital to the national defense, and DOE must ensure that appropriate levels of protection are maintained to prevent acts of theft, diversion, sabotage, espionage, or other hostile acts that may cause unacceptable risks to national security or the health and safety of the workers, public, or the environment.

The safeguards and security programs currently employed include an integrated system of access controls, information protection, physical protection, and nuclear materials accountability and control systems. The RFP safeguards and security systems are designed to provide a high degree of assurance that postulated threats are deterred, denied, contained, mitigated, or neutralized in accordance with DOE and other federal requirements.

The second endstate, unrestricted access, would require no level of protection, as all nuclear materials, hazardous materials, and United States Government assets have been removed, and the land has been transferred from DOE to another entity. In the intermediate endstate, strategic quantities of SNM, classified documents, and classified parts would still remain onsite. The reduction of the Buffer Zone and potential close proximity of the general public could in fact increase the protection program requirements for the remaining buildings. The protection program requirements would be designed to provide the same high degree of assurance required in the first endstate, restricted use.

Issues

Has an SNM offsite storage site(s) been identified for the enriched uranium, plutonium, and other SNM currently being stored at Rocky Flats?

How will protection program objectives be met if an intermediate endstate is selected?

Will access control requirements be relaxed for buildings within the PA that no longer have classified documents/parts or quantities of SNM that require protection?

SNM physical security protection requirements are very extensive. If the quantities of plutonium exceed 2.2 kilograms, DOE requires that a Protected Area (PA) be established or other compensatory measures taken. PA requirements include the establishment of stringent access controls; clearly defined physical barriers (e.g., fences, walls, and doors); a personnel identification system; inspection/search of personnel, hand carried items, and vehicles; and intrusion detection and assessment systems. The installation of intrusion detection and assessment equipment, barriers, and access control systems that will provide an adequate level of detection and assessment requires a significant amount of space surrounding a facility that contains SNM. Until all Category I and II quantities of SNM are removed from a building and RFP, these protection systems will be required.

Sources

EG&G Rocky Flats. *RFP Mission Transition Program Management Plan (Volume 2, Appendix B: Safeguards and Security, Classified Materials Consolidation and Transportation Element, Revision 7).* March 11, 1993.

Regulations

Federal regulations contain specific requirements for the protection of classified documents/parts and SNM. The RFP safeguards and security systems must comply with these requirements or an exception to these requirements must be granted by DOE Headquarters. DOE and EG&G have devised site-specific plans for the protection of this material and information at RFP. These site-specific protection requirements are presented in the *Site Safeguards and Security Plan* and the *Master Safeguards and Security Agreement.* Specific regulations that currently apply at the Rocky Flats Plant include:

- Atomic Energy Act of 1954, as amended
- U.S. Department of Energy Organization Act of 1977, Public Law 95-91
- Energy Reorganization Act of 1974, as amended, Public Law 93-438

Code of Federal Regulations

- Criteria and Procedures for Determining Eligibility for Access to Classified Matter or Significant Quantities of Special Nuclear Material, 10 CFR 710

- Trespassing on Administration Property, 10 CFR 860
- Safeguarding of Restricted Data, 10 CFR 1016
- Defense Programs; Physical Protection of Security Interests, 10 CFR 1046
- Defense Programs; Limited Arrest Authority and Use of Force by Protective Force Officers, 10 CFR 1047
- Limited Arrest Authority and Use of Force by Protective Force Officers, 10 CFR 1049
- National Security Information, 32 CFR, Chapter XX, 2000

United States Code

- Crimes and Criminal Procedure—Civil Disorders, 18 USC 231
- Crimes and Criminal Procedure—Communication Lines, Stations or Systems, 18 USC 1362-63
- Crimes and Criminal Procedure—Disclosure of Classified Material, 18 USC 798
- Crimes and Criminal Procedure—Harboring or Concealing Persons, 18 USC 792-98
- Crimes and Criminal Procedure—Importation, Manufacture, Distribution and Storage of Explosive Materials: Definitions, 18 USC 841-48
- Crimes and Criminal Procedure—Mailing Threatening Communications, 18 USC 876-78
- Crimes and Criminal Procedure—Public Money, Property or Records, 18 USC 641
- Crimes and Criminal Procedure—Riots, 18 USC 2101
- Crimes and Criminal Procedure—Treason, 18 USC 2381-85
- The Public Health and Welfare—Carrying of Firearms, Authority to Make Arrests Without Warrant, 42 USC 2201(k)
- The Public Health and Welfare—Department of Energy: Definitions, 42 USC 7101
- War and National Defense—Congressinal Finding of Necessity, 50 USC 781
- War and National Defense—Employment of Members of Communist Organizations, 50 USC 784
- War and National Defense—Security Regulations and Orders; Penalty for Violation, 50 USC 797

Executive Orders

- Safeguarding Official Information Interests of the United States, Executive Order 10501, as amended, November 5, 1953
- Security Requirements for Government Employees, Executive Order 10450, April 29, 1953

- Classification and Declassification of National Security Information and Materials, Executive Order 11652, as amended, March 8, 1972
- United States Intelligence Activities, Executive Order 12333, dated December 4, 1981
- President's Intelligence Oversight Board, Executive Order 12334, dated December 4, 1981
- National Security Information, Executive Order 12356, April 2, 1982 (3 CFR 166)
- Drug-Free Federal Workplace, Executive Order 12564, September 15, 1986

National Security Decision Directives

- Nuclear Weapons Safety, Security and Control, National Security Decision Directive 309, June 27, 1988
- National Policy for Security of National Information Telecommunications and Information Systems, National Security Decision Directive 42, July 5, 1990
- Counterintelligence and Security Countermeasures, National Security Decision Directive 47, dated October 5, 1990
- Reporting Hostile Contacts and Security Awareness, National Security Decision Directive 197, dated November 1, 1985
- National Security Decision Directive 84, March 11, 1983

DOE Orders

- Unclassified Computer Security Program, DOE Order 1360.2A
- Change 2 (Occurrence Reporting and Processing of Operations Information), DOE Order 5000.3A
- Telecommunications: Emission Security (TEMPEST), DOE Order 5300.2D
- Telecommunications: Communications Security, DOE Order 5300.3C
- Telecommunications: Protected Distribution Systems, DOE Order 5300.4C
- Control of Weapon Data, DOE Order 5610.2
- Safeguards and Security Program, DOE Order 5630.11
- Safeguards and Security Inspection and Assessment Program, DOE Order 5630.12A,
- Master Safeguards and Security Agreement, DOE Order 5630.13A
- Safeguards and Security Program Planning, DOE Order 5630.14A
- Safeguards and Security Training Program, DOE Order 5630.15
- Safeguards and Security Performance Test Program, DOE Order 5630.16

- Security Education Briefing and Awareness Program, DOE Order 5631.1B
- Personnel Security Program, DOE Order 5631.2C
- Control of Classified Visits, DOE Order 5631.4A
- Personnel Security Assurance Program, DOE Order 5631.6A
- Physical Protection of Special Nuclear Material and Vital Equipment, DOE Order 5632.2A
- Protection Program Operations, DOE Order 5632.1B
- Physical Protection of Classified Matter, DOE Order 5632.5
- Physical Protection of Property and Unclassified Facilities, DOE Order 5632.6, Change 1
- Protective Forces, DOE Order 5632.7, Change 3
- Issuance, Control, and Use of Badges, Passes, and Credentials, DOE Order 5632.9A
- Control and Accountability of Nuclear Materials: Responsibilities and Authorities, DOE Order 5633.2A
- Control and Accountability of Nuclear Materials, DOE Order 5633.3 Change 1
- Nuclear Material Transactions: Documentation and Reporting, DOE Order 5633.4
- Nuclear Materials Reporting and Data Submission, DOE Order 5633.5
- Facility Approval, Security Surveys, and Nuclear Materials Surveys, DOE Order 5634.1B
- Control of Classified Documents and Information, DOE Order 5635.1A
- Classified Computer Security Program, DOE Order 5637.1A
- Information Security Program, DOE Order 5639.1
- Violation of Laws, Losses, and Incidents of Security Concern, DOE Order 5639.3
- Technical Surveillance Countermeasures Program, DOE Order 5639.5
- Classified Computer Security Program, DOE Order 5639.6,
- Operations Security Program, DOE Order 5639.7
- Identification of Classified Information, DOE Order 5650.2B
- Identification of Unclassified Controlled Nuclear Information, DOE Order 5650.3A
- Management of Nuclear Materials, DOE Order 5660.1
- Management and Control of Foreign Intelligence, DOE Order 5670.1A
- Security of Foreign Intelligence Information and Sensitive Compartmented Information Facilities, DOE Order 5639.8

Section 5:
PRELIMINARY ENDSTATES FOR RFP

For the first year of the Integrated Planning Process, the Systems Engineering Analysis (SEA) will require two bounding endstates, restricted and unrestricted, to provide limits to the analysis. As the SEA is still under development, a test intermediate endstate will also be required for the first year for demonstration purposes only. This test intermediate endstate has been developed with informal community input. The ultimate intermediate endstate for RFP will be determined with formal stakeholder participation in year two of the Integrated Planning Process.

INTRODUCTION

Information provided by the Facility/Land Use Component will be used to develop potential endstates for RFP. For the first year of the Integrated Planning Process, the Systems Engineering Analysis (SEA) will require two bounding endstates, restricted and unrestricted, to provide limits to the analysis. As the SEA is still under development, a test intermediate endstate will also be required for the first year for demonstration purposes only. This test intermediate endstate has been developed with informal community input. Additional intermediate endstate scenarios, several of which are currently under development, will be included in an appendix document as they are finalized. The ultimate intermediate endstate will be determined with formal stakeholder participation in year two of the Integrated Planning Process.

For this evaluation, the land areas that make up the RFP will be identified by zones (see Figure 5-1). Zone A is the fenced area we recognize today as the Protected Area (PA); Zone B is the industrial and administrative space in the developed area; and Zone C is the area identified as the Buffer Zone that extends from the developed area to the plant boundaries. Zone C will be defined by quadrants for more convenient reference (see Map 3-1, page 3–6).

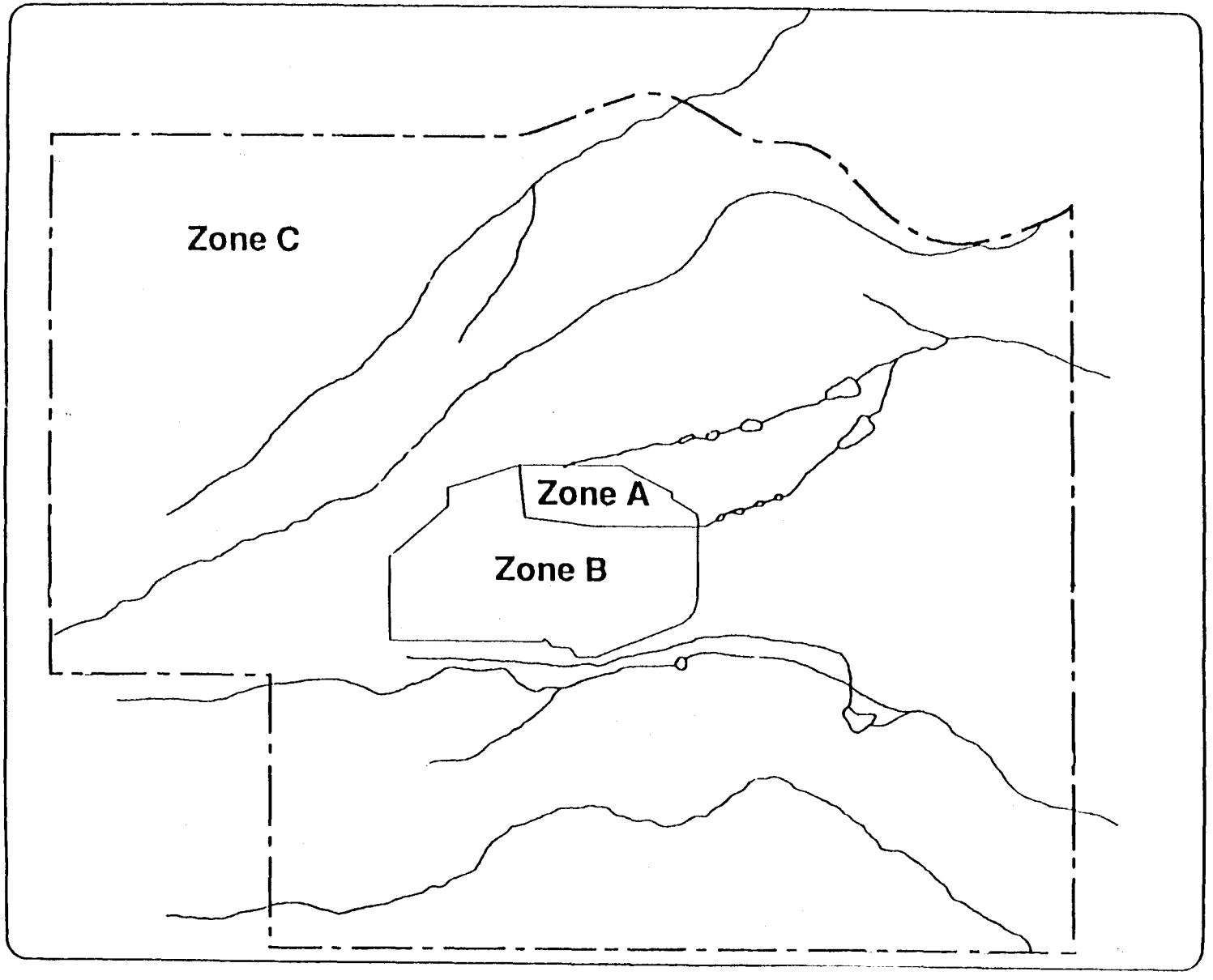

Figure 5-1 Endstate Scenario Planning Zones

ENDSTATE DESCRIPTIONS

Bounding Endstate #1 — **Unrestricted Endstate**
"Green Fields" Endstate
1E-6 Target Human Health Risk

This endstate is a bounding condition showing Zones A and B as a prairie similar to the state of the land when purchased in 1951. Zone C (Buffer Zone) is open space as it was before its purchase in 1972. The EPA determined target human health levels to be 1E-6 for public risk.

The land on which the Rocky Flats Plant is built was purchased by the federal government in 1951 to meet criteria developed by the Atomic Energy Commission for the manufacture of nuclear weapons components. Criteria for purchase included a site with a 2 mile by 2 mile area, a location 5 to 25 miles from a community with at least 25,000 population, a dry moderate climate, proximity to a good main highway, and proximity to a community airport served by major airlines.

The original purchase included approximately 2,520 acres of land situated roughly in the center of a rural and largely undeveloped 15-square-mile area that was more than 6 straight-line miles away from any population center.

In 1972, additional acreage was purchased to provide a 1- to 1 $^1/_2$-mile buffer zone to preclude nearby residential development. There were no viable structures within the acquired area. The land had been used primarily for grazing purposes. Most of the newly acquired acres were zoned for agricultural use with a small portion of the land zoned for industrial use. The *Environmental Statement—Land Acquisition* of 1972, which includes a description of the Buffer Zone environment at the time of purchase, stated that the purchase of this land would directly further the greenbelt concept of the Colorado State Environmental Commission. Total acreage at RFP today is 6,650, including the approximately 280-acre site that has been transferred to DOE's National Renewable Energy Laboratory.

Assumptions

- This shows a possible endstate in the year 2029
- All unnatural landfills have been excavated (unnatural landfills are those landfills that were created due to RFP processes or programs)
- All waste from RFP has been disposed offsite

- All buildings and infrastructure have been demolished and removed. The land has been totally restored to a natural grade

- The land is deemed surplus and is available to be developed to the degree appropriate using the present day, applicable land use criteria of local and regional governments

Bounding Endstate #2 — **Restricted Endstate**
Current RFP State
DOE Institutional Control of Site
1E-4 Target Human Health Risk

This endstate offers a restricted use of RFP. It shows the plant as it operated in 1993 (approximated by Figure 4–1, page 4–14).

This endstate shows continuing current environmental restoration activities with no new projects or changes in the present facilities and operations at RFP, except for modifications necessary for safe, environmentally sound operations. The endstate utilizes information from the Systems Engineering Analysis facility characterization and material inventory of 1993. Target human health levels are 1E-4 for public risk based on negotiations with the regulatory community. The following paragraphs describe key elements of this endstate.

Operations—Continue current operations at the RFP such as storage of SNM and wastes, and operate buildings in a stand-by mode.

Facility Upgrades, Modifications, and Renovations—Facility and equipment obsolescence are not considered for this scenario.

New Construction Projects—No new construction projects will be considered or estimated.

Environmental Restoration—Continue current environmental restoration activities, including baseline studies, site characterization, data collection, actions to reduce the spread of contamination, remedial actions, and waste management.

Assumptions

- This shows a possible plant endstate in the year 2029
- The plant complies with all appropriate regulations, including the IAG and FFCA
- RFP stores all radioactive wastes and other materials that cannot be shipped offsite for storage or disposal
- Standard waste operations continue (e.g., sewage treatment)
- RFP is not a storage site for materials from other facilities in the nuclear weapons complex
- RFP stores all SNM and other classified materials on hand in 1993

Intermediate Endstate — **First Year Test Case for Systems Engineering Analysis**

Zone A is a fenced Protected Area (PA) with the specific operational task of storing and sampling radioactive material (see Figure 4–3, page 4–18, for an approximation). Necessary maintenance operations include security, utilities, and contamination monitoring. DOE continues to own and operate the land and buildings within Zone A, where approximately 700 people are employed. Only Buildings 371 and 374 remain in place, as all other buildings and structures have been decontaminated, decommissioned, and demolished. The support buildings for 371 and 374 are located outside of the PA in Zone B.

Zone B is the area outside of the PA; it is fenced but not secured from Zone C. This is the location for support and administrative office buildings such as Building 331, fire department; Building 119, security; Building 124, water treatment; Building 130, offices and cafeteria; Building 131, administration; and various parking lots. Other specific buildings include Building 566, laundry; Building 443, steam plant; Building 995, sewage treatment plant; and Building 223, nitrogen plant. Building 865 is institutionally (DOE) owned and houses a privatized beryllium operation. DOE also owns and, through a contractor, operates an analytical lab in the area where Building 123 once stood. Building 460 is a metal fabrication facility for a privately owned and operated manufacturer. Building 850 houses a privately owned insurance company. There is also a newly constructed, privately owned factory that makes commercial products, and a restaurant is attached. There are approximately 4,000 employees in Zone B.

Zone C is the Buffer Zone. Portions of Zone C are a state-owned ecological preserve. Recreational activities are available in the north central quadrant in the Rock Creek area on land owned and operated by a local county government. Privatized light industry is occurring in the southwest quadrant. The lower southeast quadrant is leased and used for grazing and agricultural purposes. Information about land characteristics necessary to support decisions regarding this area is available in the *EG&G Rocky Flats Land Use Manual.*

Target human health levels vary from 1E-4 to 1E-6 depending on the land use receptor.

Assumptions

- This shows a possible plant endstate in the year 2029
- There is long-term storage for plutonium as stated in the draft Nuclear Weapons Complex Reconfiguration PEIS
- Residues have been shipped offsite
- Offsite waste disposal is available

PROCESS OUTLINE FOR ANALYZING ENDSTATE SCENARIOS

For the first year of the Integrated Planning Process, this document outlines the two bounding and one intermediate endstates as indicated in the above descriptions. The scenarios developed to attain these endstates will be reviewed to determine if all pertinent information necessary for input into the SEA (see Figure 1-1, page 1–4) is included. Assumptions will be verified and information from each scenario will be introduced into the SEA to generate outputs, which will be subjected to rigorous quality controls. An output report will be generated and published for each endstate scenario introduced into the SEA.

The SEA will generate data for each endstate scenario proposed to allow a comparative analysis of risk, costs, and waste for fact-based endstate decision making. Future use of this process will rely on the input of multiple scenarios developed by DOE and other stakeholders.

Section 6:
ACRONYMS

AEC	Atomic Energy Commission
ANSI	American National Standards Institute
APEN	Air Pollutant Emission Notice
ARARs	applicable or relevant and appropriate requirements
ASME	American Society of Mechanical Engineers
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAMP	Capital Assets Management Process
CAPPCA	Colorado Air Pollution Prevention and Control Act
CAQCC	Colorado Air Quality Control Commission
CCR	Colorado Code of Regulations
CDH	Colorado Department of Health
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERFA	Community Environmental Response Facilitation Act
CFR	Code of Federal Regulations
CHWA	Colorado Hazardous Waste Act
CWA	Clean Water Act
CWQCC	Colorado Water Quality Control Commission
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DP	Defense Programs
DRCOG	Denver Regional Council of Governments
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
FFCA	Federal Facility Compliance Agreement

FY	fiscal year
GIS	geographic information system
GSA	General Services Administration
GSAAR	General Services Administration Acquisition Regulation
HAP	hazardous air pollutant
IAG	Interagency Agreement
IHSS	Individual Hazardous Substance Site
IPP	Integrated Planning Process
IRAM	Incremental Risk Assessment Methodology
LCF	latent cancer fatalities
LDR	land disposal restricted
LDRs	land disposal restrictions
NCP	Oil and Hazardous Substances Contingency Plan (also known as National Contingency Plan)
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NEPA	National Environmental Policy Act
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NPDES	National Pollutant Discharge Elimination System
NRDA	Natural Resource Damage Assessment
NTS	Nevada Test Site
OSHA	Occupational Safety and Health Administration
OU	operable unit
PA	Protected Area
PEIS	Programmatic Environmental Impact Statement
PRP	Potentially Responsible Party
PSD	prevention of significant deterioration
RAQC	Regional Air Quality Council
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RFP	Rocky Flats Plant
RI	Remedial Investigation

ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act of 1986
SEA	Systems Engineering Analysis
SNM	Special Nuclear Material
SWEIS	Site-Wide Environmental Impact Statement
SWMU	Solid Waste Management Unit
TIP	transportation improvement program
TRU	transuranic
TSD	treatment, storage, and disposal
USC	United States Code
USCA	United States Code Annotated
VOC	volatile organic compound
WIPP	Waste Isolation Pilot Plant

Section 7:
GLOSSARY

alluvium Sediment deposited by flowing water, as in a river bed, flood plain, or delta.

ambient Surrounding or encircling.

beryllium A hard, brittle, gray-white metal with a very high toxicity, especially by inhalation of dust, that can be used as a moderator and reflector of neutrons in nuclear reactions.

bounding endstate Either of two endstates that limit the range of endstates available for analysis within the Systems Engineering Analysis component of the Integrated Planning Process.

Buffer Zone The 6,550 acre natural preserve surrounding the Rocky Flats Plant.

criteria pollutant The 1970 amendments to the Clean Air Act required EPA to set National Ambient Air Quality Standards for certain pollutants know to be hazardous to human health. EPA has identified and set standards to protect human health and welfare for six pollutants: ozone, carbon monoxide, total suspended particulates, sulfur dioxide, lead, and nitrogen oxide.

decommissioning Taking out of service, as in a nuclear plant or facility.

decontamination Reduction or removal of contaminating material from a structure, area, object or person.

endstate A potential disposition, used for planning purposes, for both the land and structural improvements at a site.

Environmental Assessment A document required by NEPA for proposed federal actions that serves to (1) provide brief but sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or Finding of No Significant Impact (FONSI), (2) aid agency compliance with NEPA when no EIS is necessary, and (3) facilitate preparation of an EIS if required. The Environmental Assessment should include brief discussions of (1) the need for the

proposed action, (2) alternatives to the proposed action, and (3) environmental impacts of the proposed action and alternatives. The Environmental Assessment should also include a listing of agencies and persons consulted.

Environmental Impact Statement A document required by NEPA for a "significant" proposed federal action that analyzes in detail the environmental impacts of the proposed action, discusses alternatives, and evaluates the relationship between the local, short-term uses of the environment and the maintenance of long-term productivity.

flood plain A plain bordering a river or drainage subject to flooding.

fugitive emission An emission that escapes a capture system.

groundwater Water beneath the earth's surface between saturated soil and rock that supplies wells and springs

hazardous air pollutants Air pollutants that are not covered by ambient air quality standards but which, as defined in the Clean Air Act, may reasonably be expected to cause or contribute to irreversible illness or death.

hazardous waste By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics: ignitability, corrosivity, reactivity, or toxicity.

infrastructure The basic facilities, equipment, and installations needed for the functioning of a system.

Land Disposal Restriction Restriction of land disposal for certain hazardous wastes, unless the wastes are treated or unless it can be demonstrated that there will be no migration as long as the waste remains hazardous.

low-level waste Radioactive waste that is not categorized as high-level radioactive waste, TRU waste, spent nuclear fuel, or uranium or thorium tailings. The concentration of transuranic radionuclides in low-level waste is less than 100 nCi/g.

mixed waste Waste containing both radioactive and hazardous waste constituents.

no-migration determination Determination granted by EPA as a favorable response to a no-migration petition. The no-migration petition is for an exemption under 40 CFR Part 268 subpart C and must demonstrate that no migration of hazardous constituents will result from land disposal of hazardous waste for as long as the waste remains hazardous. The no-migration determination establishes conditions that must be met with regard to emplacement of the waste and allows land disposal or emplacement of hazardous waste under these conditions.

nuclide A general term referring to the nucleus of the elements. Nuclides are distinguished by their atomic number, atomic mass, and energy state.

operable unit Term for each of a number of separate activities undertaken as part of a Superfund site cleanup.

ozone depletion Destruction of the stratospheric ozone layer that shields the earth from ultraviolet radiation harmful to biological life. This destruction of the ozone is caused by the breakdown of certain chlorine- and/or bromine-containing compounds that break down when they reach the stratosphere and catalytically destroy ozone molecules.

particulates Fine liquid or soil particles such as dust, smoke, mist, fumes, or smog; found in air or emissions.

plenum An enclosed space (e.g., a chamber in a ventilation system housing banks of filters) in which air pressure is greater than that of the outside atmosphere.

plutonium A radioactive metallic element chemically similar to uranium.

radioactive waste Waste containing radioactive constituents.

radionuclide An unstable nuclide of an element that decays or disintegrates spontaneously, emitting radiation.

remediation A long-term action that stops or substantially reduces a release or threat of a release of hazardous substances that is serious but not an immediate threat to public health.

residues Process by-products that contain amounts of Special Nuclear Material considered economically recoverable at the time of their generation.

riparian Area adjacent to rivers and streams that have a high density, diversity, and productivity of plant and animal species relative to nearby uplands.

sanitary waste General refuse and solid wastes that are not contaminated with either radioactive or hazardous material.

Special Nuclear Material Plutonium, uranium enriched in the isotope U-233 or in the isotope U-235, and any other material that, pursuant to the provisions of Section 51 of the Atomic Energy Act of 1954, as amended, has been determined to be special nuclear material, but does not include source material, or any other material enriched by any of the foregoing.

stakeholder Any individual or organization with a vested interest in the future of Rocky Flats Plant.

surficial Occurring on the earth's surface.

topography The physical features of a surface area, including relative elevations and the position of natural and man-made features.

Transition Plan A planning document that presents management actions and approaches used to transition the Rocky Flats Plant from a weapons production mission to an environmental restoration and waste management mission.

transuranic nuclide A nuclide having an atomic number greater than that of uranium (92). All transuranic nuclides are manmade and are radioactive.

transuranic waste Waste contaminated with alpha-emitting transuranic nuclides with half-lives greater than 20 years and in concentrations greater than or equal to 100 nano-curies per gram.

volatile organic compound Any organic compound that participates in atmospheric photochemical reactions except for those designated by the EPA Administrator as having negligible photochemical reactivity.

wetland An area that is regularly saturated by surface or groundwater and subsequently is characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions.

1E-6 A measure used to describe a level of risk to human health equivalent to $1x10^{-6}$ (1 in 1 million) latent cancer fatalities.

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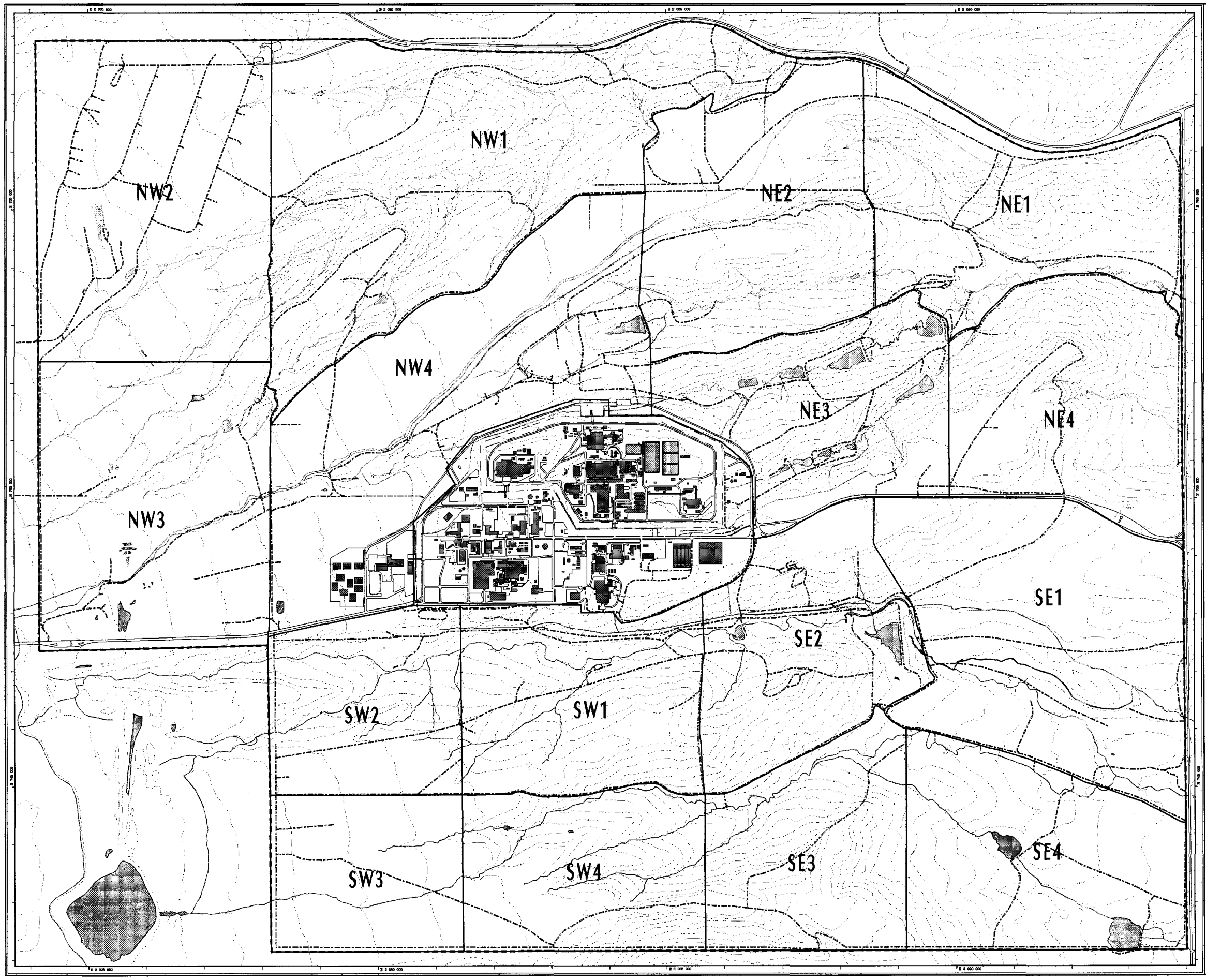

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Rocky Flats Plant

Buffer Zone Quadrants

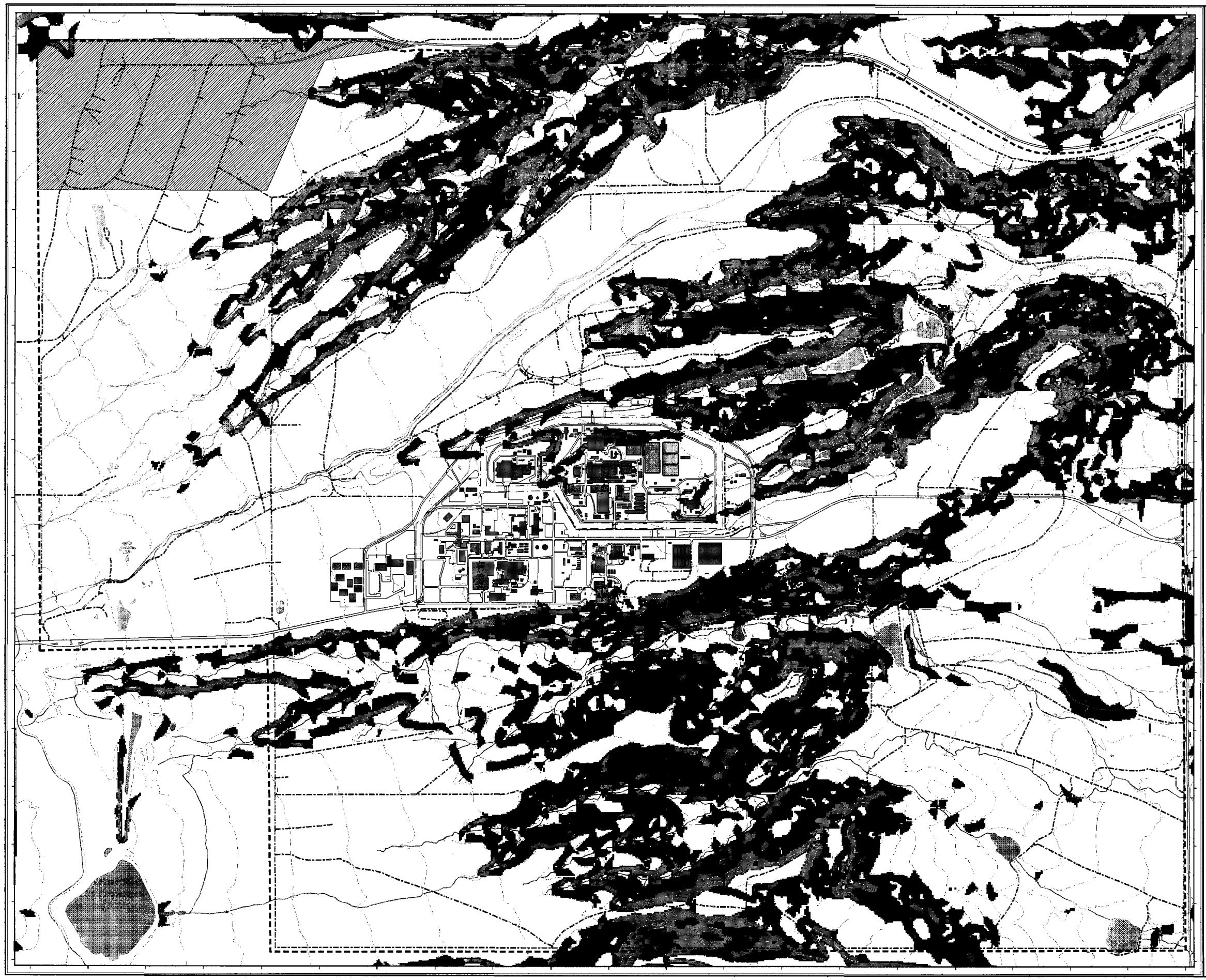
- NW1 — Buffer zone quadrant
- Lakes/ponds
- Buildings or other structures
- Streams, ditches, or other drainage features
- Paved roads
- Dirt roads
- Rocky Flats boundary

N

State Plane Coordinate Projection
Zone 3476

Prepared by:

EG&G ROCKY FLATS
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464



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Critical Slopes

- Slopes 20 to 30 percent
- Slopes over 30 percent
- National Renewable Energy Laboratory (NREL) property
- Buildings or other sturctures
- Lakes/ponds
- Streams, ditches, or other drainage features
- Paved roads
- Dirt roads
- Rocky Flats boundary

N

500 0 500 1000

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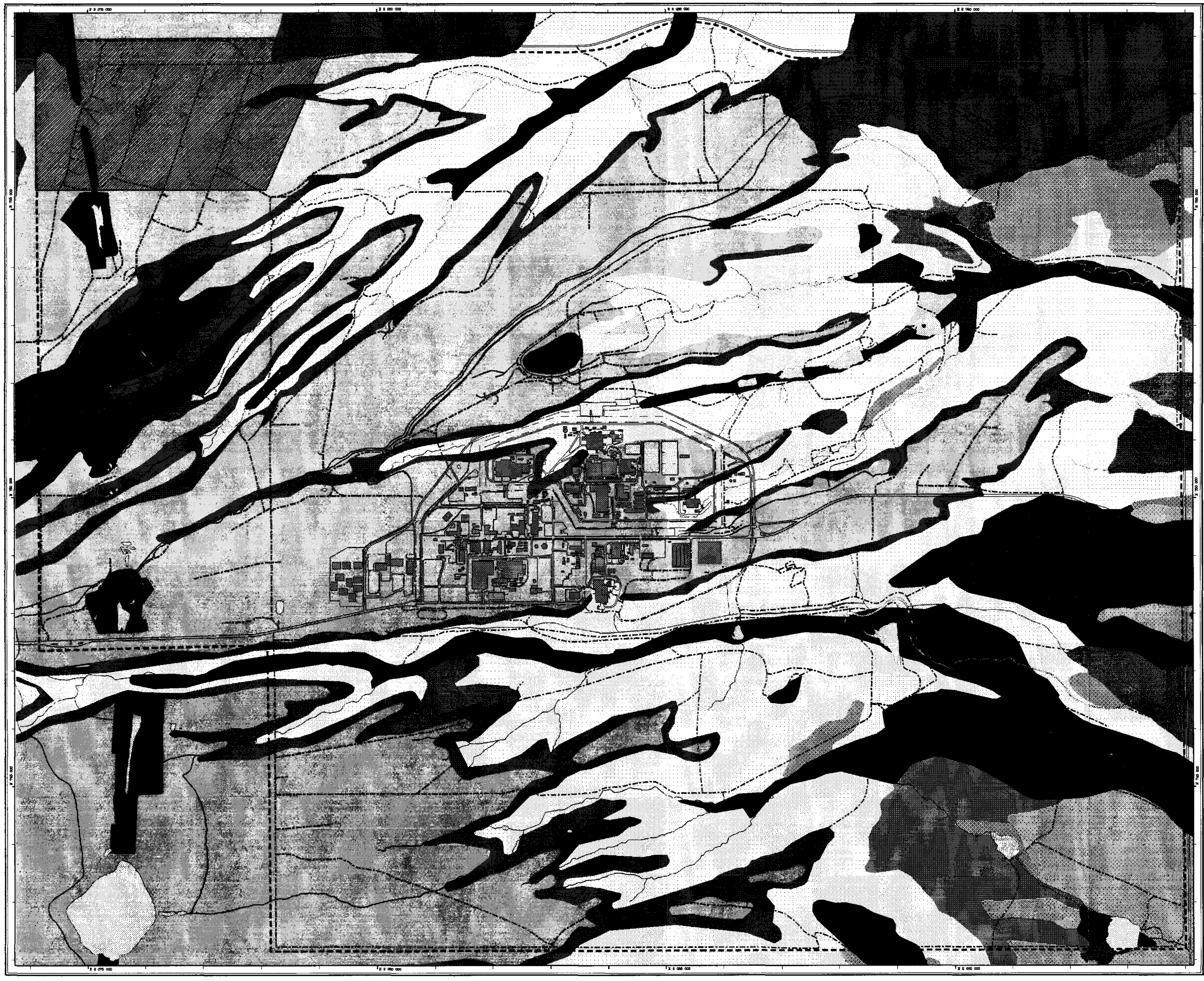

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Rocky Flats Plant

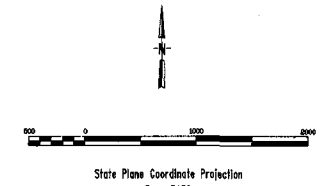
Soils

Soil Types

- Denver clay loam, 2 - 5%
- Denver clay loam, 5 - 9%
- Denver-Kutch clay loam, 5 - 9%
- Denver-Kutch-Midway clay loam, 9 - 25%
- Englewood clay loam, 0 - 2%
- Englewood clay loam, 2 - 5%
- Flatirons cobbly sandy loam, 0 - 3%
- Flatirons stoney sandy loam, 0 - 5%
- Haverson loam, 0 - 3%
- Leyden-Primen-Standley cobbly clay loams, 15 - 50%
- McClave clay loam, 0 - 3%
- Midway clay loam, 9 - 30%
- Nederland very cobbly sandy loam, 15 - 50%
- Nunn clay loam, 0 - 2%
- Pits, gravel
- Rock outcrop, Sedimentary
- Standley-Nunn gravelly clay loam, 0 - 5%
- Valmont clay loam, 0 - 3%
- Willowman-Leyden cobbly loam, 9 - 30%

Other

- Buildings or other structures
- Lakes/ponds
- National Renewable Energy Lab (NREL) property
- Streams, ditches, or other drainage features
- Paved roads
- Dirt roads
- Rocky Flats boundary



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Prepared by:

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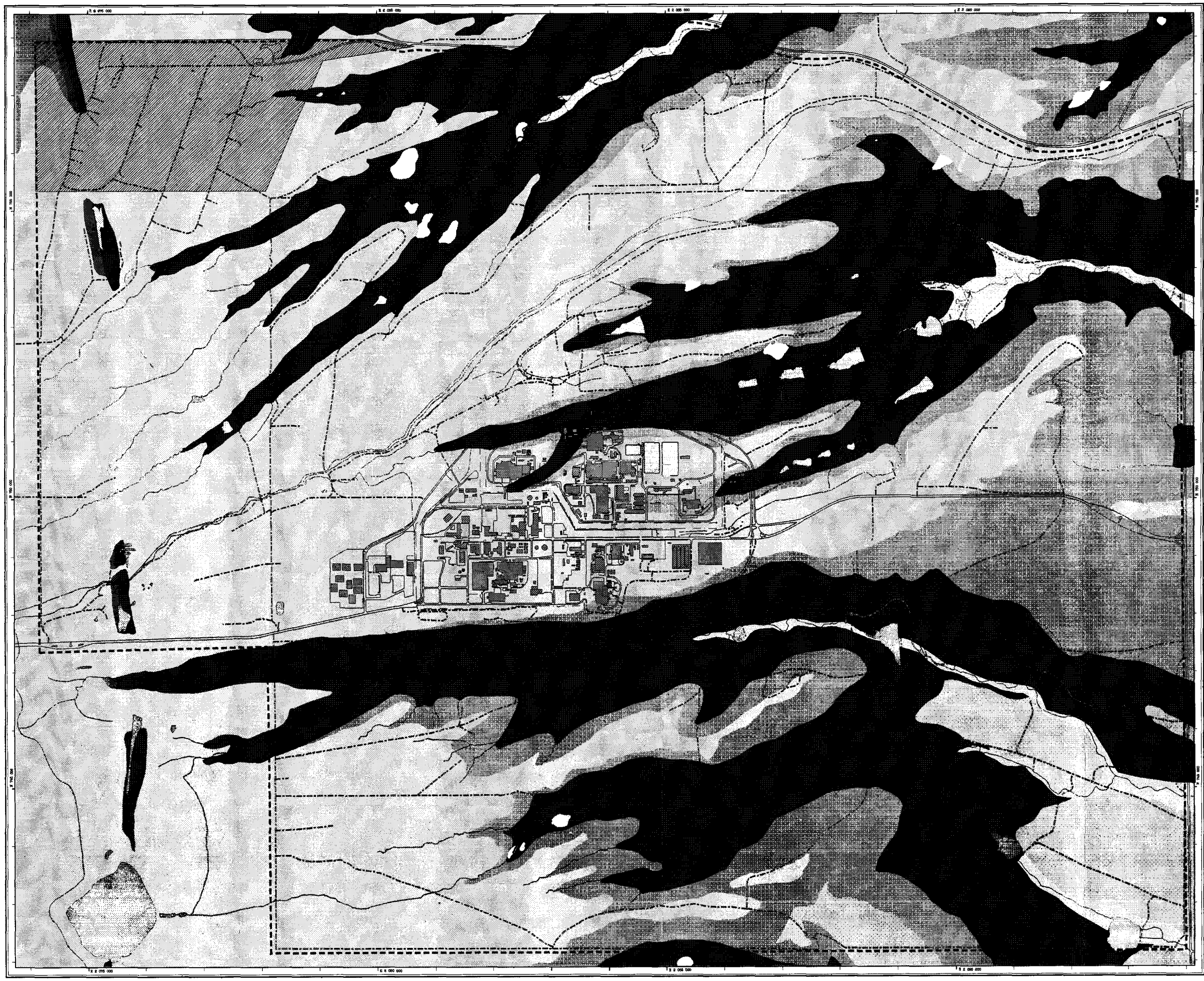
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464



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Rocky Flats Plant

Geology

Surficial Deposits

- Valley-fill alluvium
- Landslide, slump
- Undifferentiated Terrace Alluvium
- Rocky Flats Alluvium

Sedimentary Rocks

- Arapahoe Formation
- Laramie Formation
- Fox Hills Sandstone
- Pierre Shale

Other

- Buildings or other structures
- Lakes/ponds
- National Renewable Energy Lab (NREL) property
- Streams, ditches, or other drainage features
- Paved roads
- Dirt roads
- Rocky Flats boundary

N

-800 0 1600 3200

State Plane Coordinate Projection
Zone 3476

Prepared by:

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

U.S. Department of Energy

Rocky Flats Plant

100 Year Floodplain

- 100 year floodplain
- Wetlands
- National Renewable Energy Laboratory (NREL) property
- Buildings or other sturctures
- Lakes/ponds
- Streams, ditches, or other drainage features
- Paved roads
- Dirt roads
- Rocky Flats boundary

State Plane Coordinate Projection
Zone 3476

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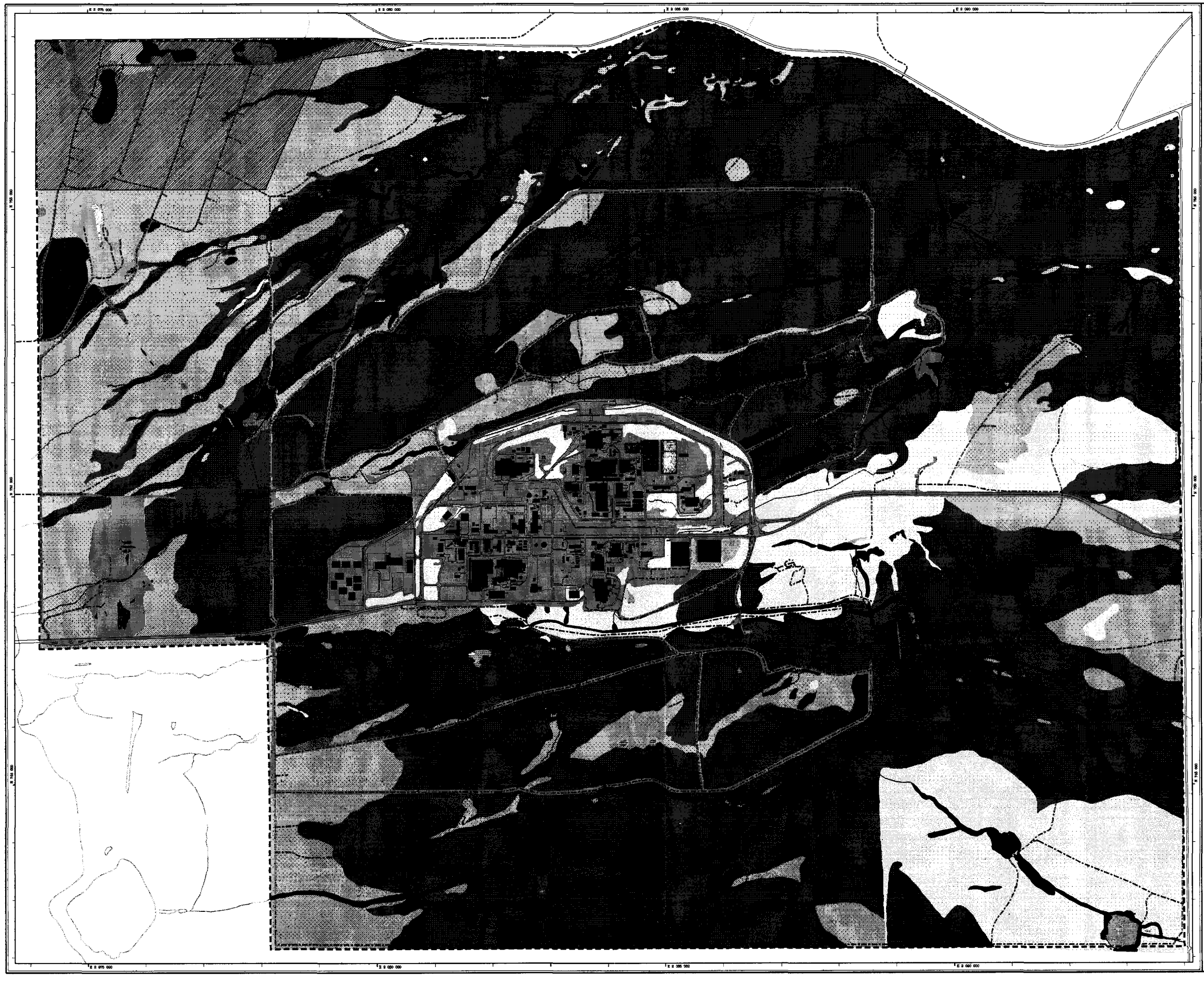

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Rocky Flats Plant

Vegetation & Sensitive Habitats

Woodland Habitats
- Ponderosa woodland (*Pinus ponderosa* & associated)
- Tree plantings (Ornamentals and Shelterbelts)

Mesophytic Shrubland Habitats
- Upland shrub, short (*Symphoricarpos* & associated)

Grassland Habitats
- Short grass (*Buchloe, Boulelous* & associated)
- Mesic mixed grassland (*Agropyron, Stipa* & associated)
- Xeric mixed grassland (*Aristida, Koeleria* & associated)
- Reclaimed mixed grass (*e.g. Agropyron cristatum.*)

Disturbance Categories
- Annual grass/forb
- Disturbed/barren lands
- Developed areas

Other
- Sensitive habitats
- Buildings or other structures
- Lakes/ponds
- National Renewable Energy Lab (NREL) property
- Streams, ditches, or other drainage features
- Paved roads
- Dirt roads
- Rocky Flats boundary

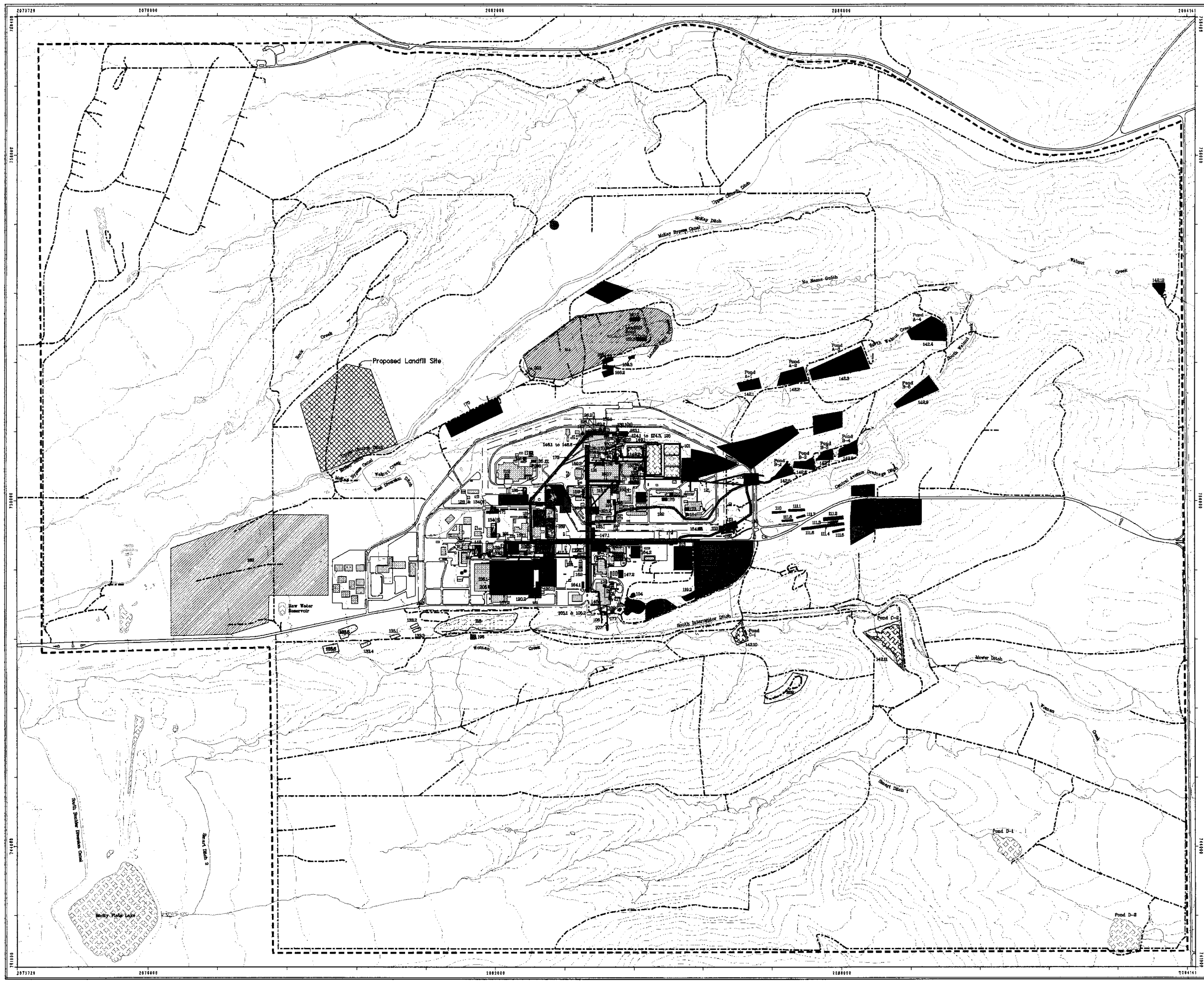
500 0 1000 2000

State Plane Coordinate Projection
Zone 3476

Prepared by:

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464



U.S. Department of Energy

Rocky Flats Plant

Individual Hazardous Substance Sites by Operable Unit

- Paved roads
- Unimproved dirt roads
- Streams, ditches, and other drainage features
- Individual Hazardous Substance Sites
- Rocky Flats Plant boundary
- Ponds/lakes
- Buildings or structures
- Operable Unit 1
- Operable Unit 2
- Operable Unit 4
- Operable Unit 5
- Operable Unit 6
- Operable Unit 7
- Operable Unit 8
- Operable Unit 9
- Operable Unit 10
- Operable Unit 11
- Operable Unit 12
- Operable Unit 13
- Operable Unit 14
- Operable Unit 15
- Operable Unit 16

Mapscale = 1 : 7200

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Golden, Colorado 80402-0464

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